MAINTENANCE MANUAL

5.25" Mini Floppy Disk Drives

F-5006
F-5008

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This Maintenance Manual is subject to change without prior notice.

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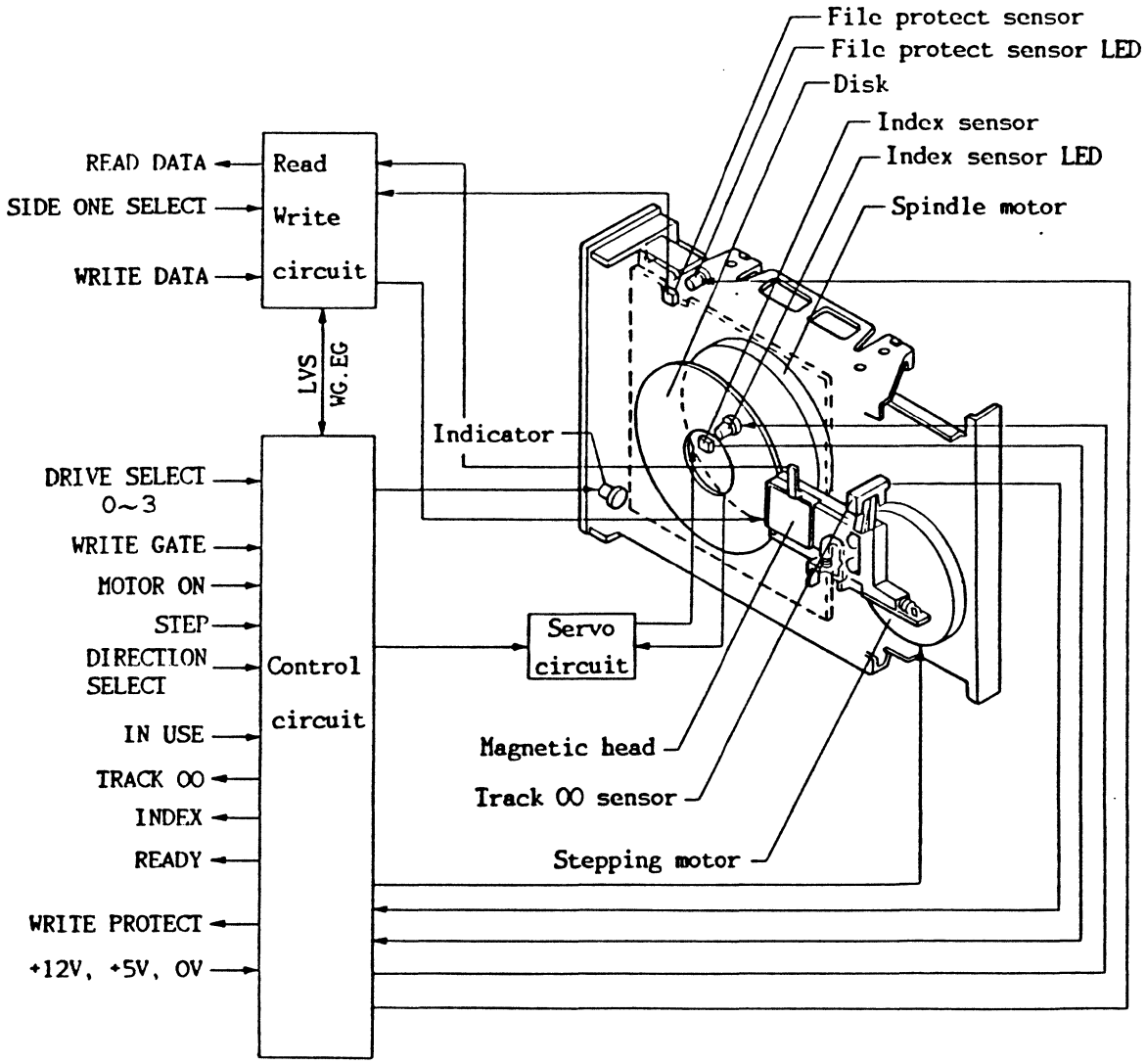


Fig. 301 Overall Block Diagram

3-1-2 Outline of structural parts

This Floppy Disk Drive uses painstakingly assembled high-precision parts because it uses flexible disks based on mylar film as the recording medium and requires the ability to interchange data with other Floppy Disk Drives. For that reason, we request that only specially trained maintenance personnel be allowed to touch the internal mechanisms and that the unit be handled carefully, taking care to avoid strong shock.

The components include the frame, door opening and closing mechanism, disk clamp mechanism, disk drive mechanism, magnetic head and carriage, head seek mechanism and various detectors.

(1) Frame

The frame is the skeleton on which the various mechanisms and PWB boards are mounted. It is based on a sheet steel chassis in order to ensure the strength, accuracy, weather resistance and expansion ratio required for stable Floppy Disk Drive reliability.

(2) Door opening and closing mechanism, disk clamp mechanism

The door opening and closing mechanism includes the clamp spring (flat spring), front lever, set arm, etc. The disk clamp mechanism (clamp assembly) is moved vertically by the end of the clamp spring.

When a disk is inserted and the front lever closed, the end of the collet enters the central window of the disk, then presses against the spindle so that the disk is accurately clamped in the correct position along the collet.

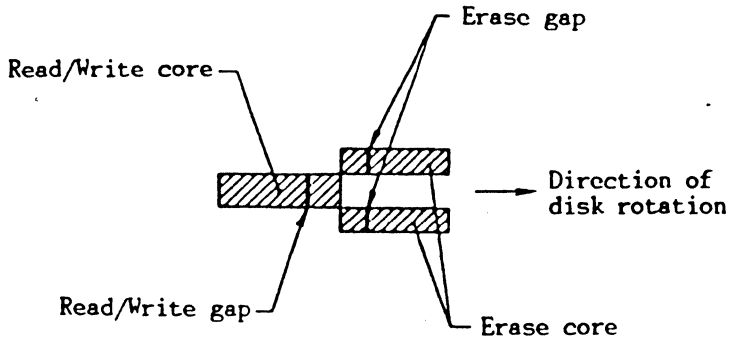
(3) Disk rotating mechanism

The disk rotating system comprises the Disk Drive motor (spindle motor) including the spindle.

The Disk Drive motor (spindle motor) is a direct spindle coupled outer rotor type DC brushless motor with an extra long service life of 20,000 hours or more of continuous operation. This servo motor rotates at 300rpm and maintains a constant speed even with load and temperature fluctuations using feedback signals from the AC tachometer built into the motor.

The collet and spindle are precision assembled at exactly the right angle. This prevents injuring the edge of the center window of the disk and accurately centers the disk so that the head and disk come into contact at the correct position.

(4) Magnetic head and carriage



Tunnel erase type head

Fig. 302 External Appearance of Magnetic Head Core

With both-side type Floppy Disk Drive units, both the side 0 and side 1 heads are of a special flat shape supported by a gimbel construction. The heads straddle the disks from the outside and are mounted on one carriage.

In order to keep wear of the surfaces of the heads from contacting the disks to a minimum, they are designed to obtain the maximum playback from the disks. As shown in Fig.302, the heads used in this Floppy Disk Drive can use tunnel erase type cores.

The center parts of tunnel erase type heads have a Read/Write gap used to record and playback data and a tunnel erase type gap for erasing the edges of tracks directly after recording.

(5) Head seek mechanism

The head seek mechanism is built around a stepping motor with a capstan (pulley) and includes a steel band, guide shaft and carriage. The carriage slides along two guide shafts and is connected to the capstan of the stepping motor via the steel band.

The stepping motor has a flat, 4-phase construction and rotates one step (1.8°) to shift the head one track. It is driven by single-phase excitation.

The parallelism and distance between the shaft and disk centerlines, as well as the shaft and capstan, are high-precision processed. Temperature expansion of the chassis, steel band, carriage etc., have been carefully studied and designed to counteract the expansion of the disk itself.

(6) Various detectors

(a) File protect detector

This detector comprises the LED and photo transistor used to detect the presence or absence of the write enable notch on the disk jacket. When a disk with this notch is loaded, the detection light path is interrupted and the operation of the write circuit is prevented. Previously written data is protected from erasure even if a record command is given by mistake. The LED is on the Disk Drive motor (spindle motor) servo PWB and the photo transistor is on the sensor block assembly.

(b) Track 00 detector

This detector comprises a photo interrupter used to detect the outermost position (track 00) of the head gap and a track 00 stopper.

The tracks inside of track 00 are used but the head cannot move outside of the range where it can self-reset when the power is turned on, even if the head should move outside due to a shock, because it strikes the track 00 stopper. Also designed to ignore, at the discretion of the circuitry inside the Floppy Disk Drive, the command to step out from the track 00 position.

In case a step out command is input at the innermost track, margin is provided so the head does not strike the head window edge of the disk but, rather, the head moves farther inward. To recalibrate (return to track 00) the track from this position, it is necessary to input a step out command for several tracks beyond the maximum number of tracks.

(c) Index detector

An index hole or center hole detector LED and photo transistor are located at the position of the index window in the disk jacket. The LED is on the Disk Drive motor (spindle motor) servo PWB and the photo transistor is on the sensor block assembly. The holes in the disk are detected in accordance with the speed the disk is rotating.

3-2 Circuit Operation

The circuit section comprises three parts: the Read/Write circuit, the control circuit and the servo circuit. The Read/Write and control circuit are on the main PWB while the servo circuit is on the Disk Drive motor (spindle motor) PWB.

3-2-1 Read/Write circuit

The Read/Write circuit comprises the read section, write section and low voltage detector section. It is mainly in the Read/Write LSI (one-chip bi-polar LSI). The block diagram is shown in Fig.303.

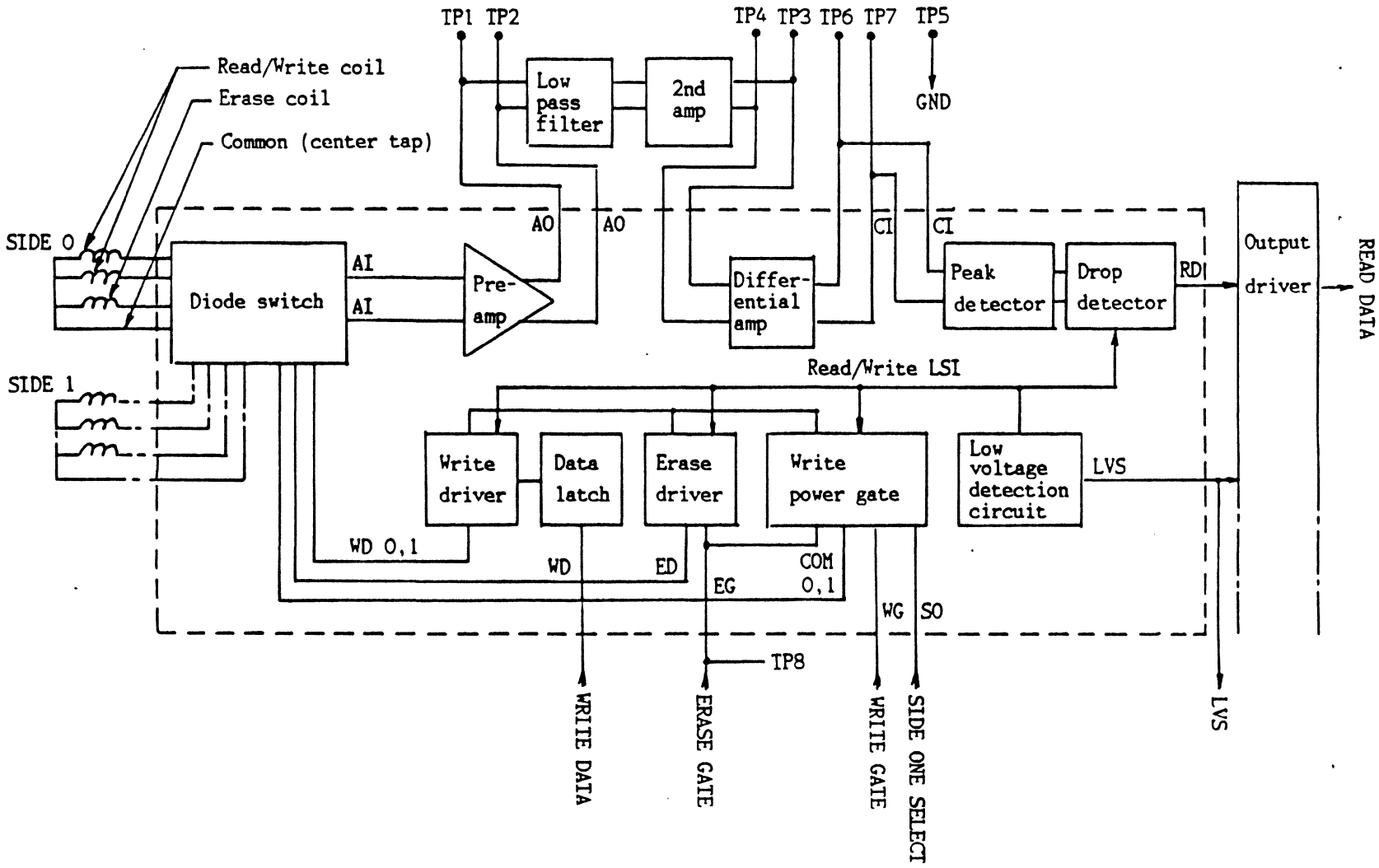


Fig. 303 Read/Write Circuit Block Diagram

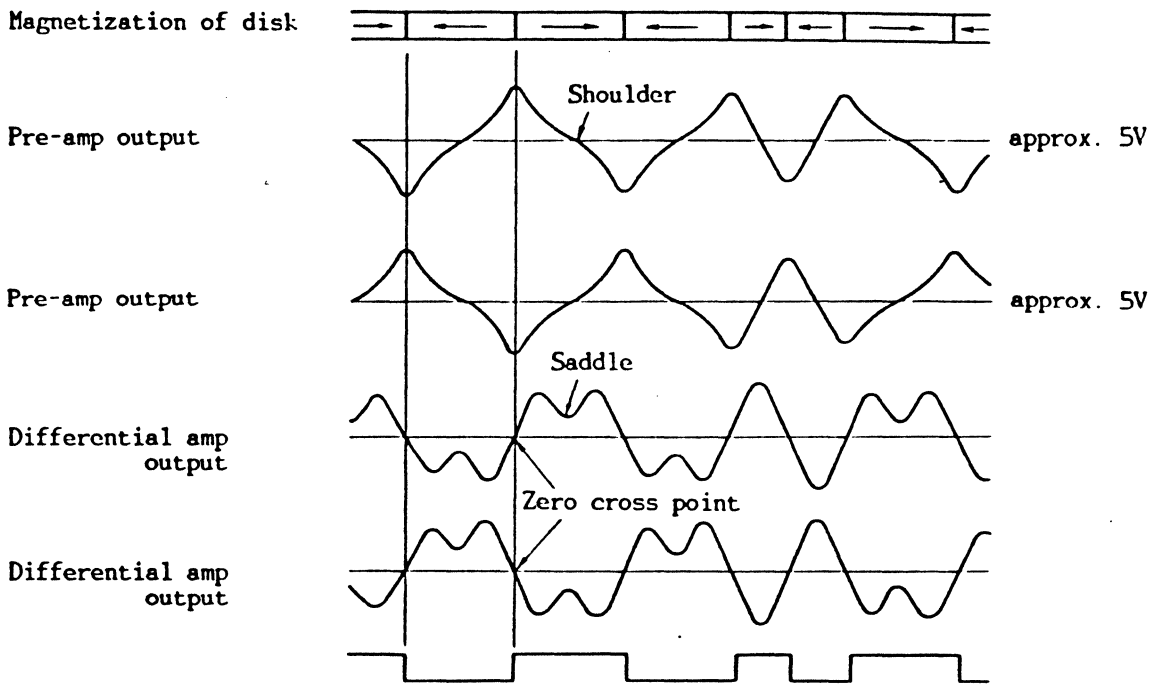


Fig. 304 Typical Read Circuit Operating Waveforms

(1) Read section

The read section comprises the pre-amp, low pass filter, differential amp, peak detector, drop detector and read gate (output driver).

The micro-voltage conducted to the Read/Write head during playback is amplified by the pre-amp which consists of a subtraction amplifier, has the spurious noise component removed by the low pass filter and goes to the differential amp. The differential amp shifts the playback signal to the zero cross position and simultaneously applies the proper amount of compensation in accordance with the difference in the frequency components, and further amplifies it. This output is converted to a square waveform by the peak detector which consists of a comparator, the bad influence of the saddle which occurs during playback of the low-frequency component (1F section: approx. 125kHz) is eliminated by the drop detector, and is output from the Floppy Disk Drive via the read gate.

(2) Write section

The write section comprises the write power gate, data latch, write driver, erase driver, and other circuits.

The file protect sensor detects the notch on the side of the disk

jacket (write enable), the write power gate turns on while the WRITE GATE input signal is TRUE and the erase gate signal generated by the timing of the location where the WRITE GATE signal is based is TRUE, and +12V is applied to the center tap of the Read/Write head. The conditions for turning on the power gates are established by the control circuit.

External WRITE DATA pulse strings are latched by the data latch, the two line drivers turn on and off alternately to send the proper record current to the Read/Write head.

Erase heads are positioned by a lattice which straddles a position 0.58mm behind the Read/Write gap. The erase gate signal is delayed by the amount of 0.7mm offset of WRITE GATE input signal and the erase driver is operated so it covers the memory area. The delay timing is controlled by the Write/Erase gate of the control circuit.

Output of the READ DATA pulse is prevented while the write driver is in the operating mode.

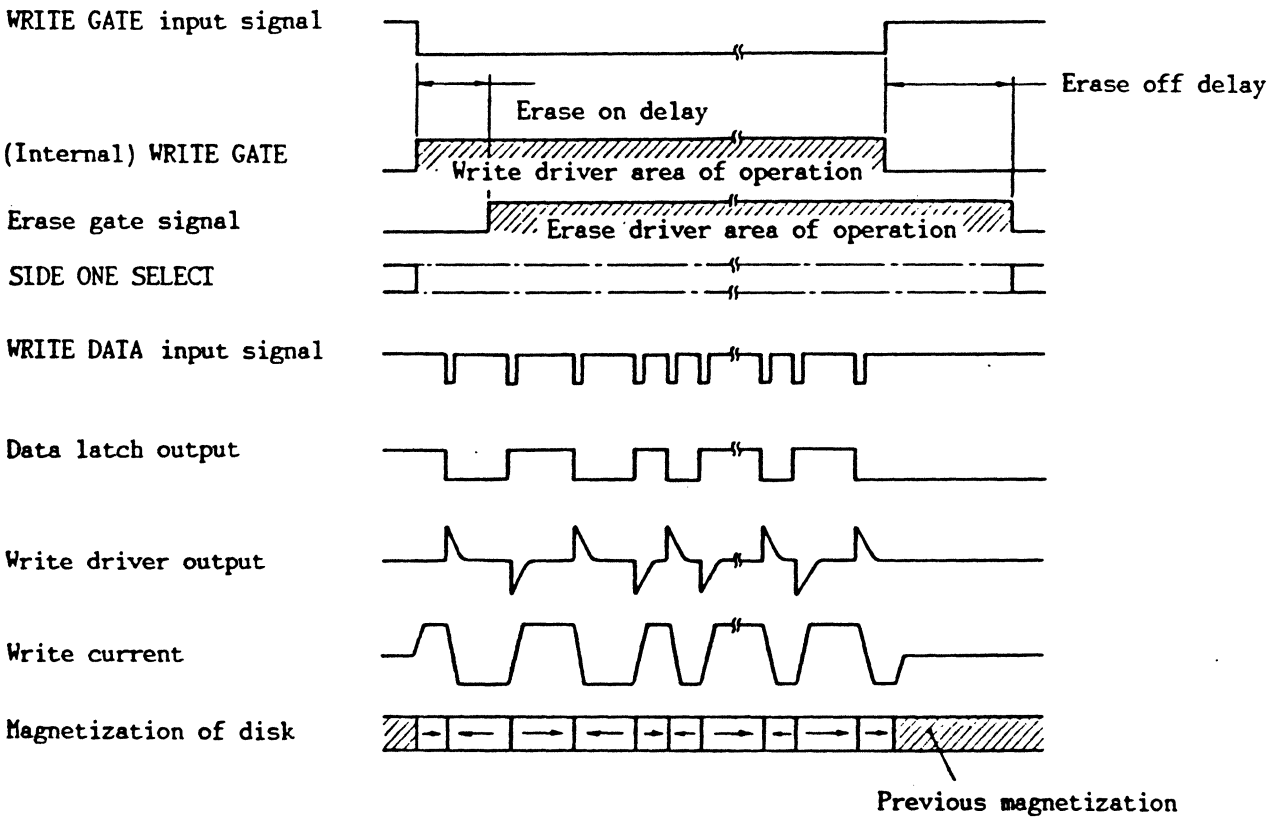


Fig. 305 Typical Write Circuit Operating Waveforms

(3) Low voltage detection circuit

The low voltage detection circuit is provided to prevent misoperation occurring in the circuitry in the Floppy Disk Drive while voltage is unstable when the power is turned on or off. The output of this detection circuit is added to almost all of the function blocks of the Read/Write circuit and control circuit to prevent misoperation of the write driver and erase driver caused when the logic in the Floppy Disk Drive does not function correctly during the period of unstable +5V or +12V voltage.

3-2-2 Control circuit

The control circuit is mainly in the control LSI (one-chip NMOS LSI) and comprises three major sections: the drive select gate which determines the drive select conditions, the Write/Erase gate which determines the timing of the current which flows to the head during recording, the spindle motor gate which determines the speed of the spindle motor and other gates, the index detector, track 00 detector, file protect detector, the ready detection circuit and other detection circuits, and the stepping motor control circuit.

All detectors (photo transistors) are mounted on the sensor block assembly and track 00 sensor assembly. All other control circuits are mounted on the main PWB assembly.

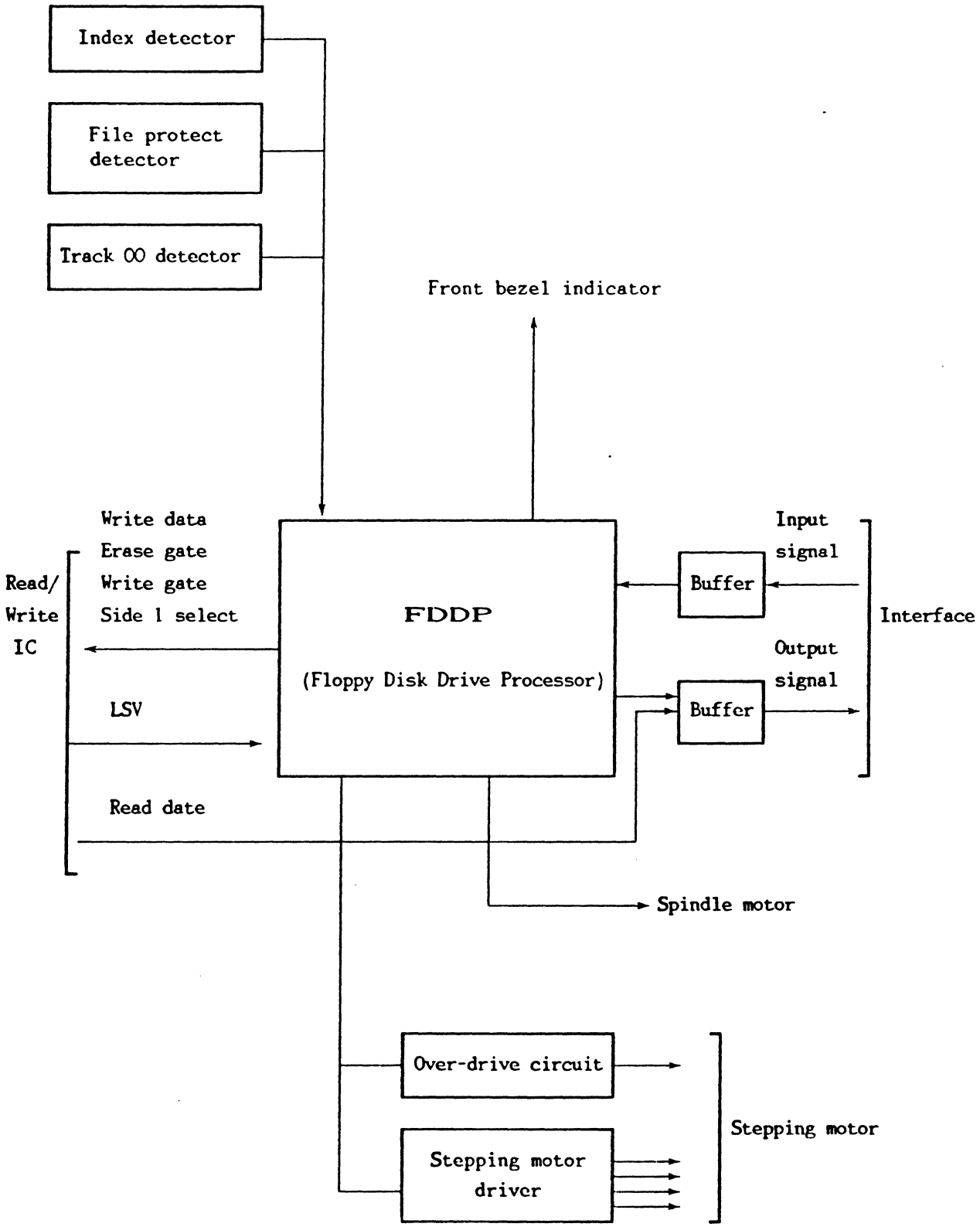
The drive select gate comprises the strap (short bar) which transmits the drive conditions to the control LSI and selects the conditions under which the front bezel indicator lights.

The Write/Erase gate determines the conditions under which the Floppy Disk Drive can write and issues the write command (write gate or erase gate signal) to the write circuit. The erase gate signal is given the required delay time by the internal counter.

The ready detect circuit receives the index pulse from the index detector and outputs the ready signal when the disk reaches the correct speed.

The stepping motor control circuit comprises the direction latch, over-drive single shot, etc.

The direction latch samples and holds the direction in which the head indicated by the DIRECTION SELECT is moving each time the STEP pulse is input.


Index detector
File protect detector
Track 00 detector
Front bezel indicator
Write data
Erase gate
Write gate
Side 1 select
Read/ Write IC
FDDP
(Floppy Disk Drive Processor)
Buffer
Input signal
Output signal
Interface
LSV
Read date
Spindle motor
Over-drive circuit
Stepping motor driver
Stepping motor

The output of the step pulse generator circuit turns on the over-drive circuit for the prescribed time (approx. 60msec.). During this time, +12V is impressed on one side of the stepping motor coil so that sufficient torque is available for seeking and centering. After centering is completed, sufficient torque is left for holding the head at the stop position and to prevent unnecessary power loss by impressing or not impressing +5V on the stepping motor coil. This also prevents the generation of excessive heat by the motor so power consumption by the stepping motor when not seeking is only about 0.33W.

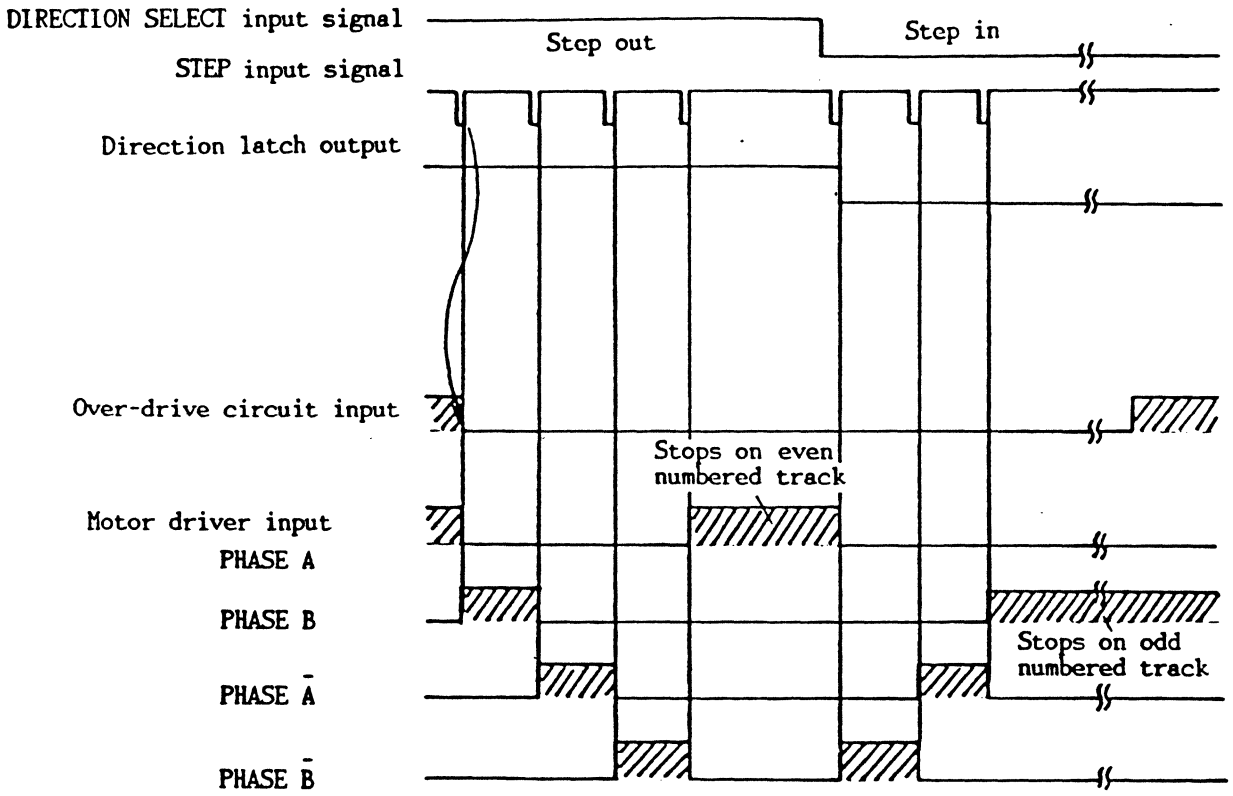


Fig. 307 Typical Stepping Motor Control Circuit Operation Waveforms

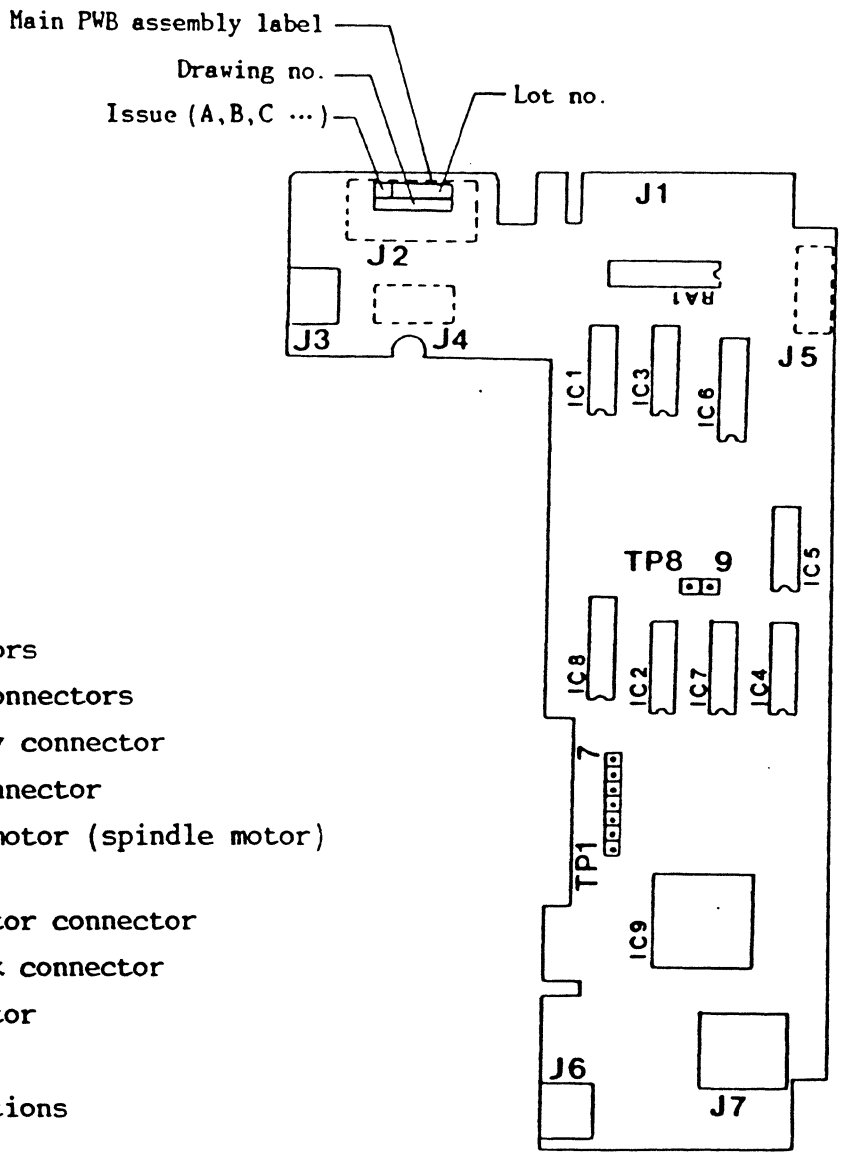
3-2-3 Servo circuit

The servo circuit maintains a constant spindle motor speed and is mounted on the PWB in the spindle motor unit. The spindle motor (Disk Drive motor) is started and stopped by the MOTOR ON signal from the control circuit.

This is an alternating current type, long life brushless 3-phase coil motor driven by a special 3-phase driver IC. The 3-phase flow of electricity and the switching of the direction of excitation are performed by signals from the Hall element mounted on the PWB on the outer periphery of the rotor, with the sequential drive coil and direction of extation controlled so they switch to the prescribed direction of rotation. The speed of rotation is accurately maintained at the desired valve by F-V converting (frequency to voltage conversion) the feedback signal from the AC tachometer etched on the PWB inside the rotor with another servo IC and applying this to the drive voltage control section of the 3-phase driver IC.

3-3 Test Point Functions and Type of Connectors

Fig.308 shows the layout of the test points and connectors.



Type of connectors

J1: Interface connectors
J2: Power supply connector
J3: Track 00 connector
J4: Disk Drive motor (spindle motor) connector
J5: Stepping motor connector
J6: Sensor block connector
J7: Head connector

Test point functions

TP1: Pre-amp out
TP2: Pre-amp out
TP3: 2nd amp out
TP4: 2nd amp out
TP5: GND (OV)
TP6: Differential amp
TP7: Differential amp
TP8: Erase gate
TP9: Track 00 sensor

Fig.308 Layout of Test Points and Connectors

3-3-1 Test point functions

The following 9 test points (including one ground) are provided for monitoring the waveforms required for inspection and adjustment of the Floppy Disk Drive on main PWB assembly.

(1) TP9 (track 00 sensor)

This test point is provided for monitoring the output of the photo transistor (Schmidt inverter built-in) used for track 00 detection. Like the TRACK 00 output signal, the state is LOW when the head is on or near track 00.

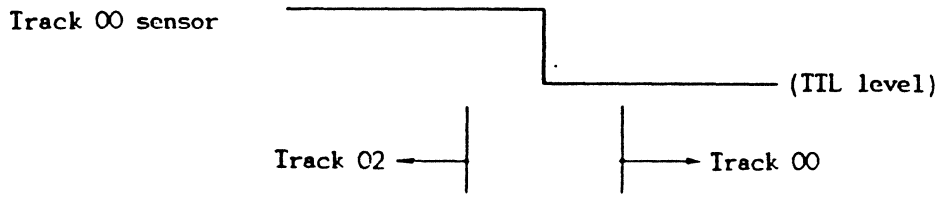


Fig. 309 Typical Waveform

Note: 1. The TRACK 00 output signal first becomes TRUE (LOW level) while the basic excitation phase A for the stepping motor is excited. Because of this, the timing of the TP9 waveform variation is not constant.

(2) TP8 (erase gate)

This test point is for monitoring the erase gate signal. At the LOW level, the prescribed current is flowing in the erase head. This is used to check the erase gate delay time against the WRITE GATE input signal.

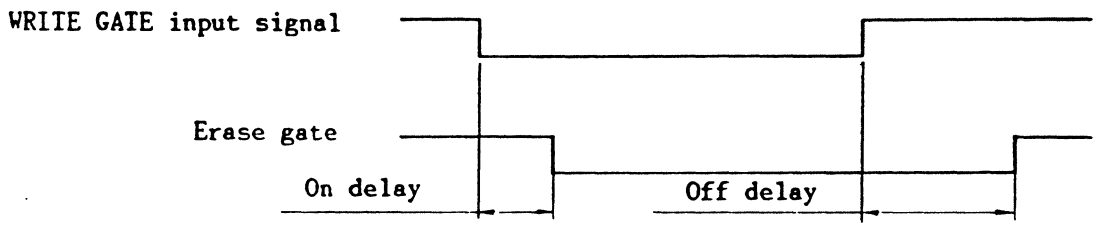


Fig. 310 Typical Waveforms

Delay	Tunnel erase type head
On delay	250±10μs (for 1.6MB) 300± 5μs (for 1MB)
Off delay	505±10μs (for 1.6MB) 575±10μs (for 1MB)

Table 301 Erase Gate Delay

(3) TP3, TP4 (2nd amp)

These test points are provided for monitoring the Read/Write amp output.

The 2nd amp has two phase inverted (180°) outputs of several tens to several hundreds of mVp-p. These can be monitored at TP3 and TP4. For accurate waveform monitoring, a dual trace (2-channel) oscilloscope should be used with one channel at ADD for the input mode to monitor TP3 and TP4 as one waveform. The oscilloscope can be grounded to the nearby TP5 (0V).

TP3 and TP4 can also be used to check and adjust the various Read/Write head characteristics, track alignment, etc., and mechanical elements such as the head seek mechanism, magnetic head, etc.

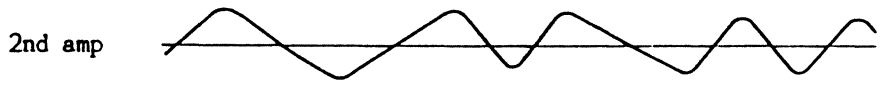


Fig. 311 Typical Waveforms

(4) TP6, TP7 (differential amp)

These test points are used for monitoring the differential amp output.

As for the pre-amp and 2nd amp, the differential amp has two phase inverted (180°) outputs of several tens to several hundreds of mVp-p. These can be monitored at TP6 and TP7. For accurate waveform monitoring, a dual trace (2-channel) oscilloscope should be used with one channel at ADD for the input mode to monitor TP6 and TP7 as one waveform. The oscilloscope can be grounded to the nearby TP5 (0V).

TP6 and TP7 can be used for checking the overall operation of the Read/Write head and amp as well as for checking and adjusting track alignment, etc., and mechanical elements such as the head seek mechanism and magnetic head.

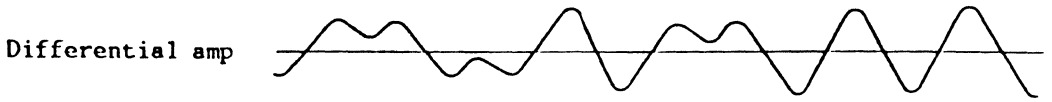


Fig. 312 Typical Waveforms

(5) TP5 (OV)

Used for grounding test instruments, etc. When using one-touch clips, however, there is danger of shorting nearby test points so use small clips connected to probes.

SECTION 4

Explanation of Maintenance

4-1 Maintenance Outline

4-1-1 Periodic maintenance

As long as a Floppy Disk Drive is used at the normal rate, periodic maintenance such as parts replacement, lubrication, etc., should not be required for 5 years.

Using a cleaning disk to clean the magnetic heads, however, is effective for improving data reliability so we recommend doing this at the intervals given in Table 401. Concerning maintenance parts in the Floppy Disk Drive, we recommend periodic replacement of assemblies at the intervals shown in Table 403, especially when the unit is used more than normal or when the 5 year period has been exceeded.

Change parts in accordance with the item 4-4, refering to the item 4-2.

Periodic Maintenance Item	Recommended Interval	Time Required	Item Explaining Maintenance
Magnetic head cleaning	Refer to 4-3-1, 4-3-2	5 min.	4-3-1
Replacement of maintenance parts	Refer to 4-1-3, 4-5		

Table 401 Periodic Maintenance Items

4-1-2 Inspection and adjustment

Table 402 shows all inspection and adjustment items.

The itmes listed here are not required at fixed intervals like periodic maintenance items. When replacing maintenance parts, or when a breakdown occurs, refer to the items in 4-2 or 4-3 as required.

The maintenance sequence shown in Table 402 is for complete inspection and adjustment.

Maintenance Sequence	Inspection and Adjustment Items	Time Required	Item Explaining Maintenance
1	Collet assembly centering adjustment	5 min.	4-4-1
2	Front lever position adjustment	5 min.	4-4-2
3	Bail inspection and adjustment	5 min.	4-4-3
4	File protect sensor inspection	5 min.	4-4-4
5	Disk speed inspection and adjustment	5 min.	4-4-5
6	Head touch inspection and adjustment	5 min.	4-4-6
7	Asymmetry inspection	5 min.	4-4-7
8	Read level inspection	5 min.	4-4-8
9	Resolution inspection	5 min.	4-4-9
10	Track alignment inspection and adjustment	10 min.	4-4-10
11	Track 00 sensor inspection and adjustment	5 min.	4-4-11
12	Track 00 stopper inspection and adjustment	5 min.	4-4-12
13	Index burst timing inspection and adjustment	5 min.	4-4-13

Table 402 Inspection and Adjustment Items

4-1-3 Replacement of maintenance parts

We recommend that maintenance parts be periodically replaced as indicated below when a Floppy Disk Drive is used frequently, or when 5 or more years have elapsed.

Table 403 is a complete list of maintenance parts. The parts recommended for periodic replacement should be replaced when the indicated period has passed. When a replacement period is not indicated, there is no need for periodic replacement.

Under normal usage, there is normally no need for periodic replacement of all consumable parts.

Cautions concerning the entries in the maintenance parts list:

(1) The drawing number of the main PWB assembly differs depending on the signal interface, etc., so always check the actual on the actual PWB.

(2) The drawing numbers for the front bezel assembly and front lever assembly are entered for the standard color (black). For other colors, please order using the indicated color drawing number.

(3) Parts not indicated for periodic replacement need not be replaced periodically. Only replace when a breakdown occurs.

(4) When two replacement periods are given for a part, the one that elapses first has priority.

(5) Times given for parts replacement include the time required for inspection and adjustment.

(6) When ordering maintenance parts, always indicate the drawing number.

Table 403-1 F-5006 (double side, 96tpi, 1.6Mbyte) Maintenance Parts List

Maintenance Parts			Parts Replacement		
Parts Names	Application	Drawing No.	Recommended replacement Interval	Time Required	Reference Item
Head carriage assembly	Standard	JA3-5181	7000 hours, or 5×10^6 seek operations with head load and motor on	45 min.	4-5-1
Stepping motor	Standard	J3-5174	5×10^6 seek operations	30 min.	4-5-2
Steel band assembly	Standard	JA3-5398	Replace at same time as stepping motor	——	4-5-2
Disk Drive motor (spindle motor)	Standard	J3-5153	20000 hours with motor on	20 min.	4-5-3
Collet assembly	Standard	JA3-5079	——	15 min.	4-5-4
Track 00 block assembly	Standard	JA4-5414	——	10 min.	4-5-5
Main PWB assembly	Standard, caution (1)	JA2-5159	——	15 min.	4-5-6
Sensor block assembly	Standard	JA4-5409	——	15 min.	4-5-7
Front bezel	Standard, caution (2)	J2-5158	——	10 min.	4-5-8
Front lever assembly	Standard, caution (2)	JA4-5424	——	5 min.	4-5-9
Clamp cam assembly	Standard	JA4-5419	——	10 min.	4-5-10

Table 403-2 F-5008 (double side, 96tpi, 1/1.6Mbyte) Maintenance Parts List

Maintenance Parts			Parts Replacement		
Parts Names	Application	Drawing No.	Recommended replacement Interval	Time Required	Reference Item
Head carriage assembly	Standard	JA3-5181	7000 hours, or 5×10^6 seek operations with head load and motor on	45 min.	4-5-1
Stepping motor	Standard	J3-5174	5×10^6 seek operations	30 min.	4-5-2
Steel band assembly	Standard	JA3-5398	Replace at same time as stepping motor	——	4-5-2
Disk Drive motor (spindle motor)	Standard	J3-5152	20000 hours with motor on	20 min.	4-5-3
Collet assembly	Standard	JA3-5079	——	15 min.	4-5-4
Track 00 block assembly	Standard	JA4-5414	——	10 min.	4-5-5
Main PWB assembly	Standard, caution (1)	JA2-5170	——	15 min.	4-5-6
Sensor block assembly	Standard	JA4-5409	——	15 min.	4-5-7
Front bezel	Standard, caution (2)	J2-5158	——	10 min.	4-5-8
Front lever assembly	Standard, caution (2)	JA4-5424	——	5 min.	4-5-9
Clamp cam assembly	Standard	JA4-5419	——	10 min.	4-5-10

4-1-4 Tools required for maintenance

The measuring instruments, jigs and tools required for complete maintenance of this Floppy Disk Drive are as follows.

(1) Measuring instruments
- (a) Floppy Disk Drive control system and DC power supply (users system)
- (b) Dual-trace oscilloscope
- (c) Frequency counter
- (d) Digital voltmeter
- (e) DC clip-on ammeter
- (f) Relative humidity gauge

(2) Tools
- (a) Cross tip screwdrivers M2.6, M3
- (b) Minus screwdrivers, small and medium
- (c) Allen wrench, 1.5mm flats
- (d) Tweezers
- (e) Radio pliers
- (f) Nippers
- (g) Solder and soldering iron
- (h) Fine brush

(3) Special jigs
- (a) MAX media jig (jig D)

(4) Disks
- (a) Work disk (ordinary commercially available disk)
- (b) Cleaning disk (ordinary commercially available type, double side)
- (c) Level disk
- (d) Alignment disk (double side, 96tpi)

(5) Maintenance parts
- (a) Anhydrous alcohol (ethanol)
- (b) Cotton, gauze
- (c) Screw lock
- (d) Epoxy
- (e) Screws, washers (see item 5-2-2)
- (f) Lubricating oil (KANTO KASEI 946P or any equivalent to it)
- (g) Light oil (NIPPON KOYU LTD. HH-17 or any equivalent to it)

Note: Use only corrected measuring instruments and measurement disks.

4-2 Maintenance Cautions

4-2-1 Screw torque and screw lock

Unless otherwise indicated, all screws should be tightened to the torque listed in Table 404.

Screw Size	Screw torque
M2	2 kg.cm
M2.6	4.5 kg.cm
M3	6 kg.cm
M3 setscrew	4.5 kg.cm

Table 404 Screw Torque

When loosening or tightening the M3 setscrew when making adjustments or replacing parts, please use the following procedure.

(1) When making an adjustment, completely remove the setscrew and remove the old screwlock as completely as possible. Also remove any screwlock adhering to parts around the setscrew.

(2) When replacing a setscrew, use tweezers to apply screwlock to the first 3 threads.

(3) Replace the setscrew, adjust and tighten to the designated torque.

Apply a small amount of screwlock to the designated places after tightening ordinary screws, too.

4-2-2 Handling the connectors

(1) Inserting and removing connectors

Always be sure to turn off the power before inserting or removing a connector. Do not apply excessive force to cables or post pin. Pull out or insert straight and positively.

(2) Cautions in handling white connectors (J3, J4, J5, J6) (refer to Fig.308)

(a) Removing connectors J4, J5

As shown in Fig.401, press the tab at the top of the housing in the direction of the arrow, using a finger (fingernail) or minus screwdriver.

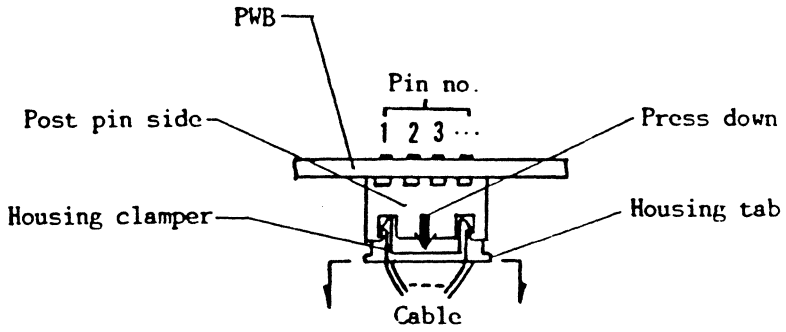


Fig. 401 Removing White Connectors (J4, J5)

(b) Removing connectors J3, J6 (refer to Fig.308)

As shown in Fig.402, press the housing section in the direction of the arrow with a finger (fingernail) or minus screwdriver.

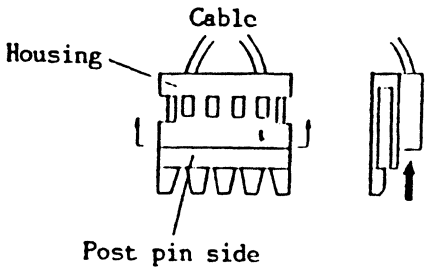


Fig. 402 Removing White Connectors (J3, J6)

(c) Removing a black connector (J7) (refer to Fig.308)

As shown in Fig.403, insert the tips of a pair of tweezers into the opening in the back of the housing and remove J7 (head connector). Do not pull on the thin cable.

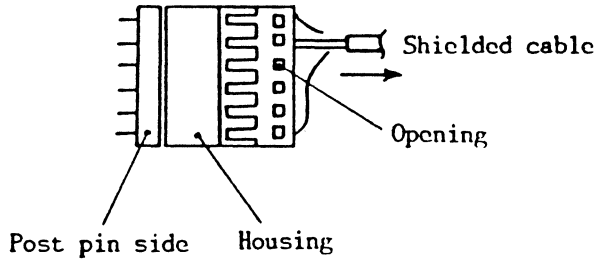


Fig. 403 Removing J7 (head connector)

(d) Inserting the connector

Align the key with the post pin and housing, and press into the back of the housing with a finger.

4-2-3 Head cable treatment

It is necessary for the head cable to be fastened for a suitable length to the clamper in order for the head carriage to move smoothly along the tracks.

(1) With the head carriage set at track 00, fasten the head cable so that it has a suitable length using the disk guide cable clamper. A length of approximately 80mm from the head carriage outlet to the tab is sufficient. Make sure the head cable does not catch on the back end of the steel band. (Refer to Fig.404-1, 2)

(2) Pass the head cable under the chassis, press down the tab, and hold the head cable under the chassis with the cable clamper. The length of the cable between the tab and the cable clamper should be about 45mm.

(3) Pass the head cable through the U-groove of the disk guide, bring it out above the chassis and plug into the head connector.

The length of the cable between the U-groove of the disk guide and the head connector should be about 35mm. (refer to Fig.404-2)

When the head cable is long, adjust the length of the cable between two cable clampers.

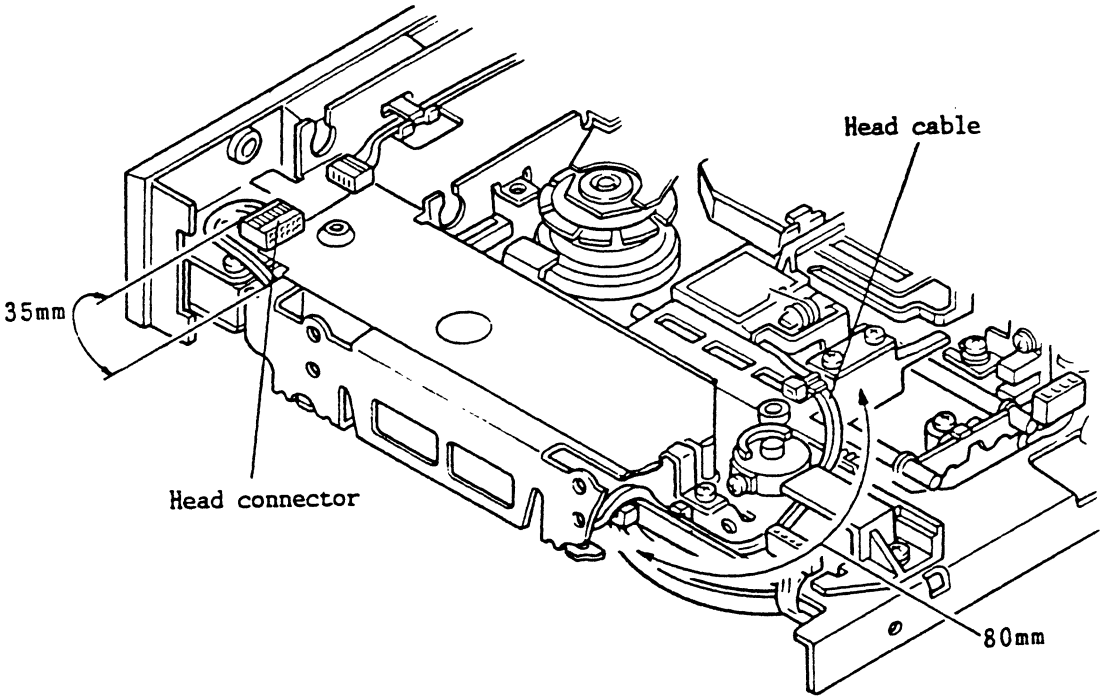


Fig. 404-1

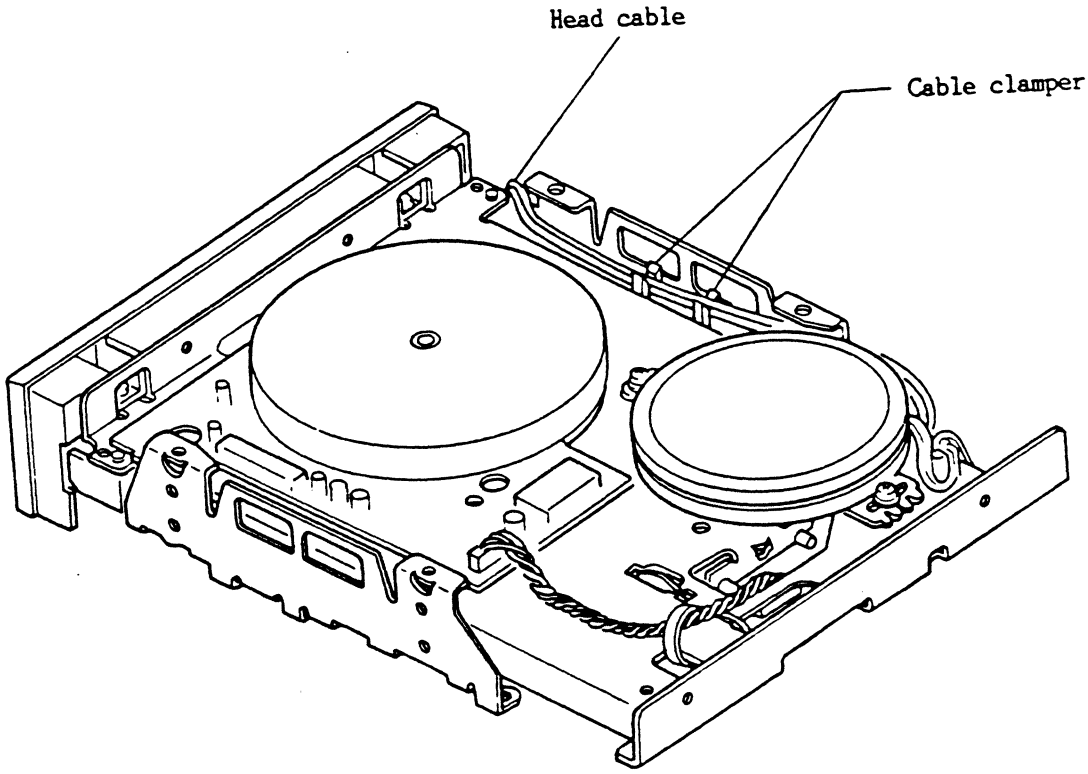


Fig. 404-2 Head Cable Dressing

4-2-4 Others

(1) Overall error test

The data Read/Write error test is not included in the inspection and adjustment methods of item 4-4. When inspecting, adjusting or replacing parts, we advise connecting this Floppy Disk Drive to the users system or performing an error test (window margin test is most desirable).

(2) Setting the Floppy Disk Drive strap

First check whether or not the set value for the strap (short bar) on the main PWB is compatible with the system used for inspection and adjustment.

Notes: 1. In order to simplify the following explanations, we will assume that the DSO short bar is on.

2. When the setting of the Floppy Disk Drive strap has changed since the system was installed, always remember to return it to the original condition after completing the maintenance.

(3) Operating environment

Perform Floppy Disk Drive maintenance on a clean table or desk, where there is no dust, and under normal temperature and humidity conditions.

We recommend that track alignment inspection and adjustment be made after leaving the machine in the room for 2 hours or more to adjust to the temperature and humidity conditions. If the work bench or table is not clean, dust or dirt can easily adhere to the magnetic heads, disks, etc.

(4) Probe ground connection

Connect the probe grounds of measuring instruments as follows.

(a) When measuring test points TP1, 2, 3, 4, 6, 7 on the main PWB:
Use test point TP5 (0V) on the main PWB.

(b) When measuring other Floppy Disk Drive test points:
Use test point TP5 (0V) on the main PWB, or GND of the system power supply and others.

(5) Floppy Disk Drive position

Unless indicated otherwise, Floppy Disk Drive inspections and adjustments may be made with the unit placed either horizontal or vertical as shown below.

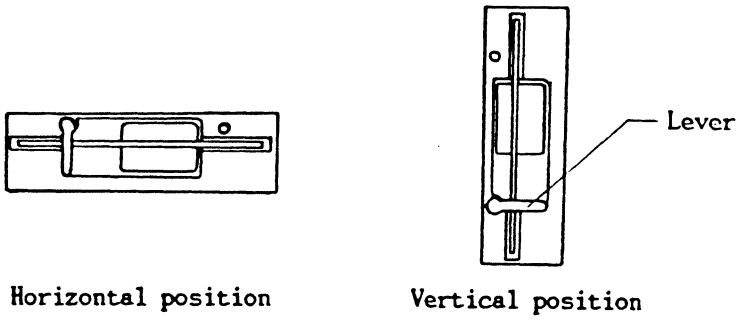


Fig. 405 Floppy Disk Drive Position During Maintenance

(6) Work disk

(7) Head load

This Floppy Disk Drive is not equipped with a head load solenoid so the head is always loaded when a test disk is inserted and the lever closed.

4-3 Periodic Maintenance

4-3-1 Cleaning the magnetic heads with a cleaning disk

When a Floppy Disk Drive is used in a dusty environment, it is advisable to periodically clean the magnetic heads with a cleaning disk. The heads of a double side Floppy Disk Drive are especially hard to clean directly so use the cleaning disk. This also improves data reliability when performed periodically, even in a normal environment.

(A) Tools required

(1) Cleaning disk

(2) Users system

(B) Cleaning procedure

(1) Start the spindle motor and load the cleaning disk.

Note: 1. Do not use a scratched or damaged cleaning disk.

2. Always use a double side cleaning disk. Both heads of side 0 (lower) and side 1 (upper) are cleaned at the same time.

(2) Clean for approximately 10~30 seconds at an appropriate track position. Effective cleaning is also possible by alternately moving back and forth between track 00 and the innermost track to avoid concentrating on one track position.

Note: The optimum cleaning time varies with the type of cleaning disk used. Cleaning for too long accomplishes nothing and can cause head wear.

(3) Remove the cleaning disk.

4-4 Inspection and Adjustment Methods

4-4-1 Collet assembly centering adjustment

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Screwlock

(B) Adjustment procedure

(1) Remove the 3 screws (refer to Fig.407) fastening the shield cover and remove the cover.

(2) Loosen the 2 screws fastening the clamp holder assembly so that the clamp holder assembly can be moved with the hands.

(3) Release the door lock cam, turn the front lever to clamp. Fasten with felt, etc., to prevent contact with the upper and lower heads.

(4) In this state, fine adjust the clamp holder assembly so that the gap between the collet center and clamp holder is uniform (refer to Fig.406), press in the direction of the arrow with a finger and tighten the clamp holder screws.

(5) Turn the front lever to open or close the collet, make sure the operation is performed smoothly without catching on the spindle cap and that the Disk Drive motor (spindle motor) can be turned by hand when clamped without the collet center touching the clamp holder.

(6) Apply screwlock to the heads of the mounting screws.

(7) Install the shield cover by reversing the procedure given in item (1).

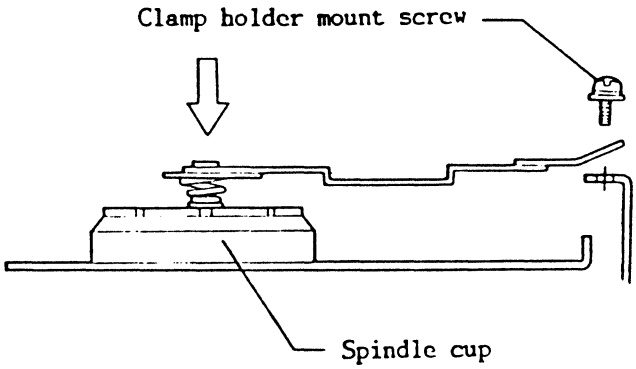


Fig. 406-a

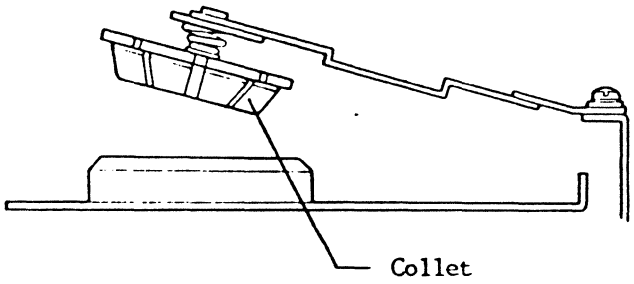


Fig. 406-b

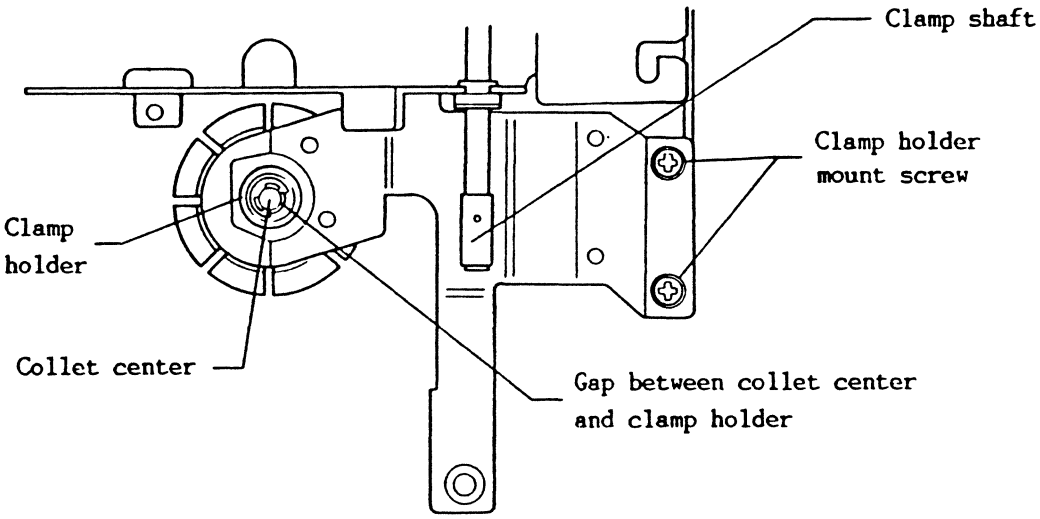


Fig. 406-c Gap between the clamp holder and collet center

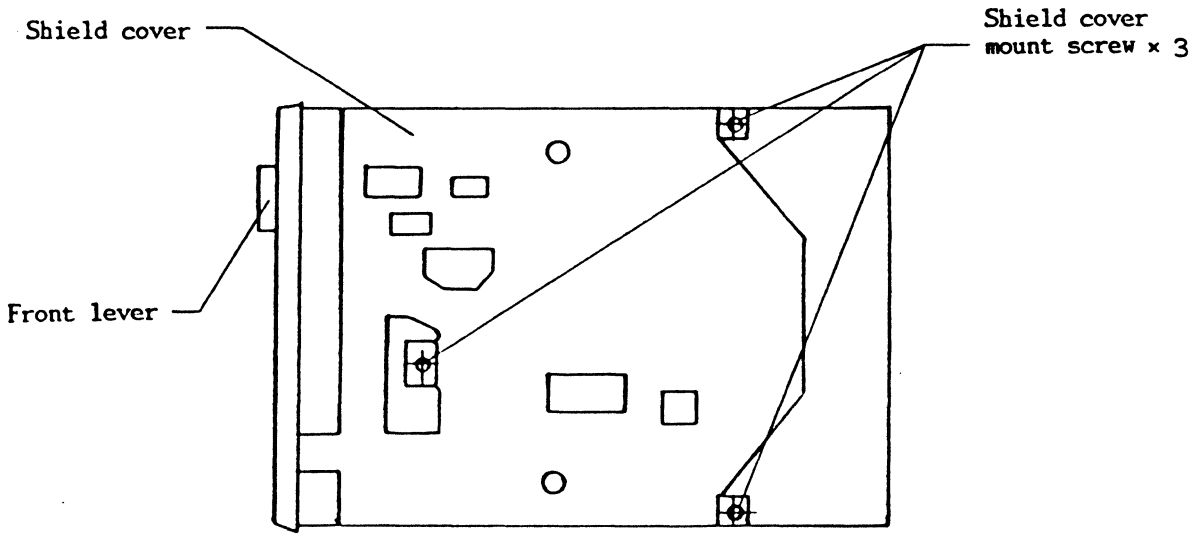


Fig. 407 Shield Cover Mount Screw Locations

4-4-2 Front lever position adjustment

(A) Tools required

(1) Allen wrench, 1.5mm

(2) MAX media jig (jig D)

(B) Adjustment procedure

(1) Turn the front lever to the closed position, loosen the lever setscrew and pull out the lever approximately 0.5mm

(2) Open the front lever and attach the MAX media jig at the position shown in Fig.408 (with the notch on the left side).

(3) Turn the front lever to the closed position and press against the MAX media jig. Make sure that the lever shaft pin is in the slot of the front lever.

(4) In this state, tighten the setscrew to the designated torque (refer to Fig.409).

(5) Open and close the lever and make sure the lever spring does not straddle the MAX media jig.

(6) Open the front lever and remove the jig.

Note: Refer to item 4-2-1 for the handling of the setscrew and follow the instructions carefully.

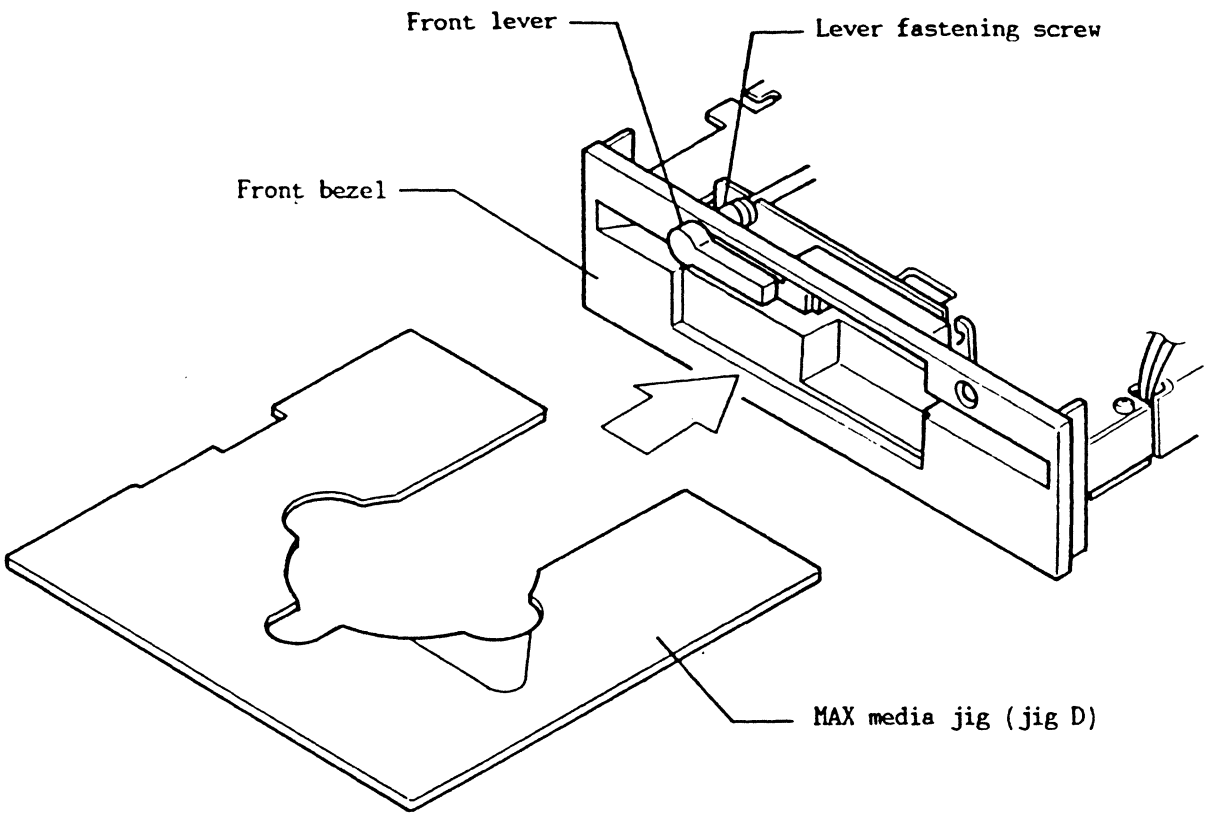


Fig. 408 Front Lever Adjustment

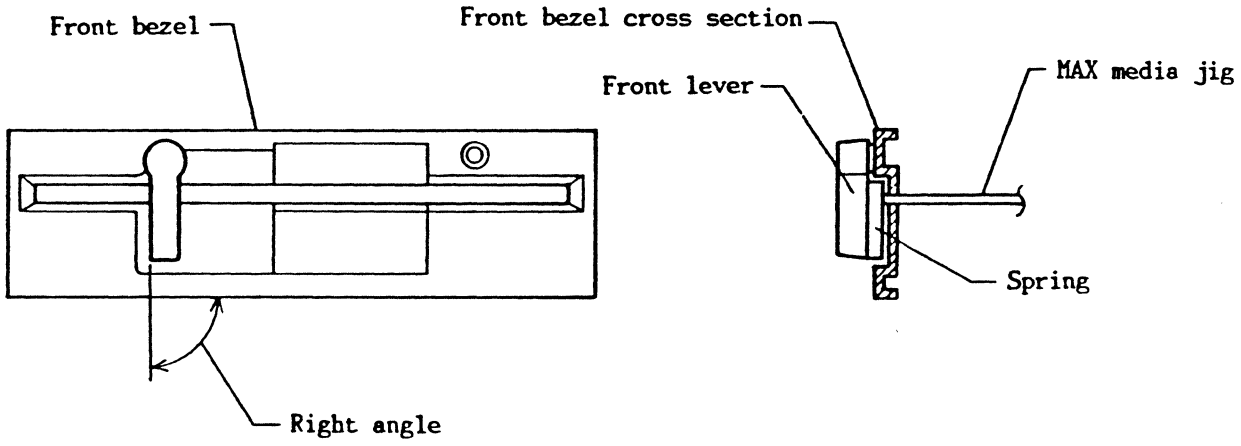


Fig. 409 Front Lever Position

4-4-3 Bail inspection and adjustment

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Adhesive

(B) Inspection and adjustment procedure

(1) Open the front lever so a disk can be inserted.

(2) Make sure the gap between the bail and chassis is 19.5mm (refer to Fig.411).

(3) When the gap is not correct, turn the adjustment screw (refer to Fig.410) on the bail assembly to adjust the gap to be 19.5mm rect value.

(4) Slowly insert a disk and make sure that it can be inserted without the disk jacket touching the side 0 or side 1 heads, and that the margin is sufficient.

(5) Open and close the front lever to clamp the disk 2 or 3 times to make sure the clamp operation is smooth.

(6) Slowly remove the disk and make sure the disk jacket head window (the opening in the jacket where the head contacts the disk) does not touch the side 0 or side 1 heads, and that there is sufficient margin.

(7) Apply adhesive to the head of the adjustment screw and fasten it to the bail.

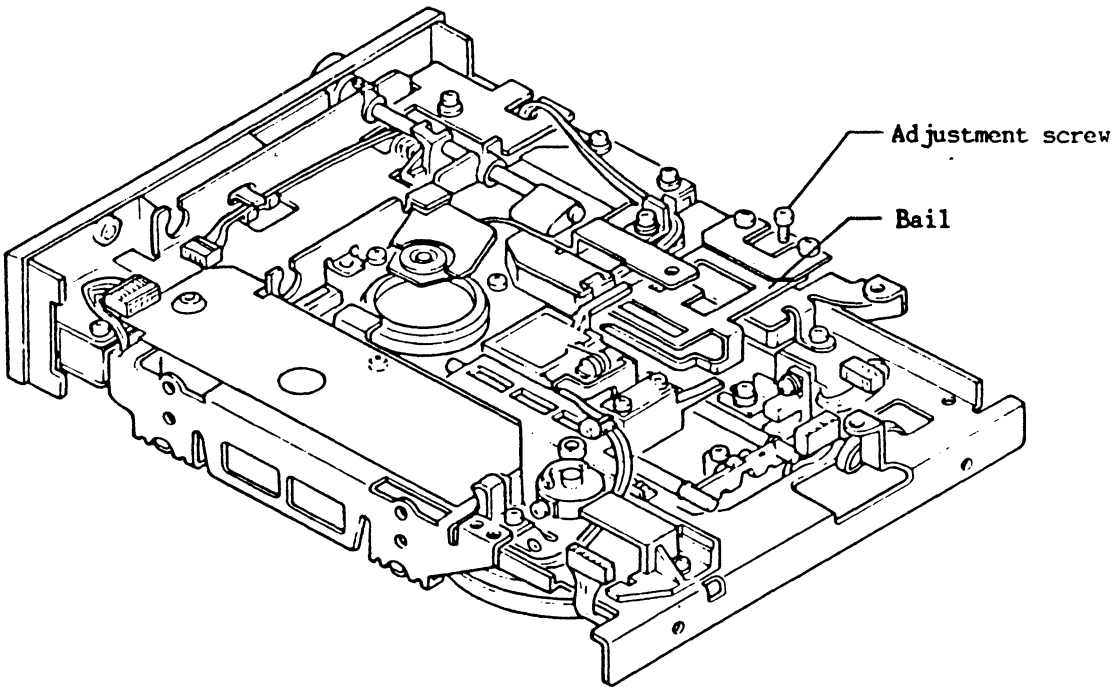
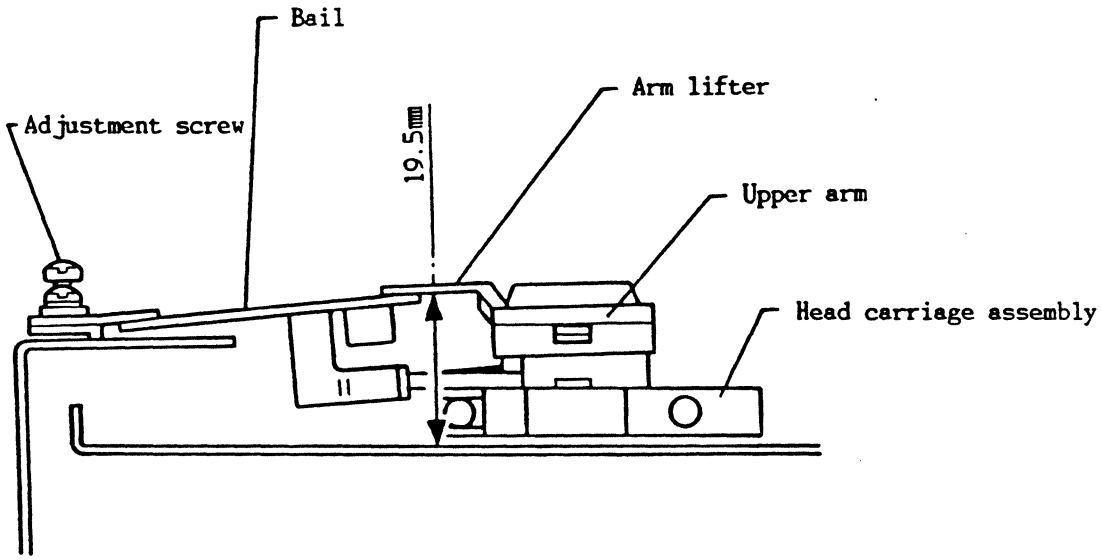


Fig. 410 Bail Adjustment



Note: Viewed from the front bezel side.

Fig. 411 Bail Height

4-4-4 File protect sensor inspection

(A) Tools required

(1) MAX media jig (jig D)

(2) Digital voltmeter (or oscilloscope)

(3) Users system

(B) Inspection procedure

(1) Place the Floppy Disk Drive so that the LED indicator is down and the front lever is up.

(2) Connect the digital voltmeter or oscilloscope (DC range, 1V/div) to the write protect interface signal line.

(3) Mount the MAX media jig in the position shown in Fig.412 so that the notch A is above the light path of the write protect sensor (refer to Fig.412).

(4) Move the Floppy Disk Drive so that strong external light does not strike the file protect sensor.

(5) Make sure the write protect interface signal line voltage is within the range shown below when the Floppy Disk Drive power is turned on.

Notch A position voltage: 0.5V or less.

(6) Pull the jig out slightly so that notch B is in the light path.

(7) Make sure the write protect interface signal line voltage is within the range shown below when the Floppy Disk Drive power is turned on.

Notch B position voltage: 3.0V or more.

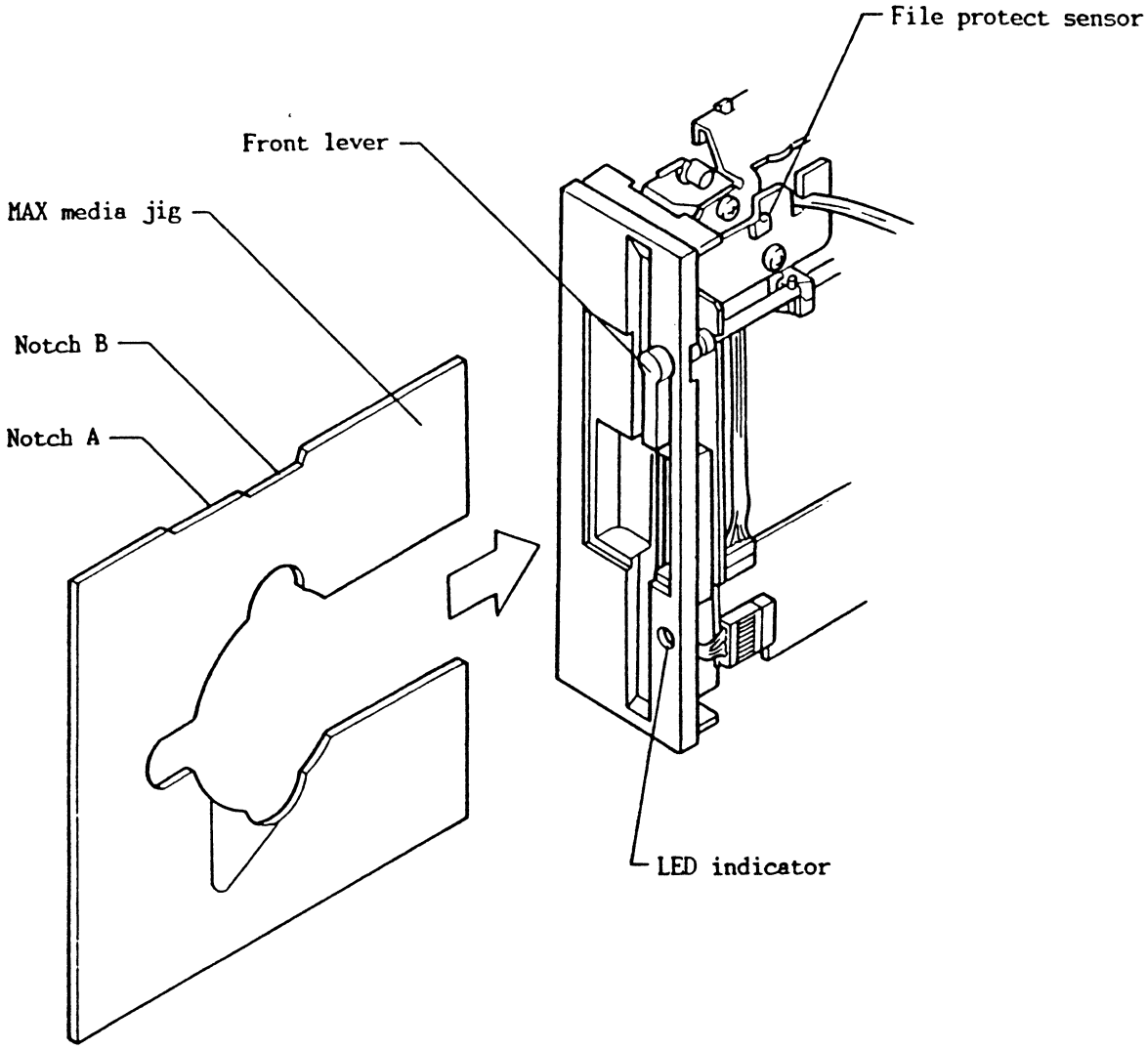


Fig. 412 File Protect Sensor Inspection

4-4-5 Disk rotation speed inspection and adjustment

(A) Tools required

(1) Minus screwdriver, small

(2) Users system

(3) Frequency counter

(4) Work disk (soft sector)

(B) Inspection and adjustment procedure

(1) Connect the frequency counter to the INDEX interface signal line.

(2) Start the spindle motor and load the work disk.

(3) Set the head to track 00.

(4) Make sure the pulse intervals of the index interface signal line are 200±3msec (for 1MB) and 166.7±2.5msec. (for 1.6MB).

4-4-6 Head touch inspection and adjustment

(A) Tools required

(1) Work disk
(2) Minus screwdriver, small
(3) Users system
(4) Oscilloscope
(5) DC clip-on ammeter
(6) Screwlock

(B) Adjustment procedure

(1) Connect the oscilloscope to TP6, TP7 (differential amp) of the main PWB assembly.
Oscilloscope range: AC mode, 0.2V

(2) Start the spindle motor and load the work disk.

(3) Shift the head to the innermost track.

(4) Use the constant 2F (WRITE DATA frequency; for 1.6MB: 250kHz, for 1MB: 125kHz) frequency to perform a record and playback cycle. Repeat in sequence.

(5) Write down the average values from (4).

(6) Press the top of the head very slightly (the weight of a finger, or 10~20g), repeat the procedure in item (4) and again again find the average values as in item (5).

(7) Compare the average values found in items (6) to make sure the read level in item (5) is kept at 80% or more.

(8) For double side type Floppy Disk Drive units, perform the items (4)~(7) separately for side 0 and side 1.

(9) Shift the head to track 00 and repeat items (4)~(8).

(10) Cause and remedy for poor Floppy Disk Drive head touch
When the results of items (7)~(9) for a double side Floppy

Disk Drive are not satisfactory, the following are probable causes:

(a) Fautly disk

If the disk or jacket is bent or damaged, replace it with a new one.

(b) Faulty head pressure

When the movable flat spring (flexure) that rides on the head piece (white part) on side 0 or side 1 due to poor adjustment of the bail (item 4-4-3), it is necessary to replace the head carriage assembly in accordance with item 4-5-1.

Deformation, or bending, can be checked by removing the disk, slowly opening and closing the front lever and visually checking whether or not the surfaces of the heads on sides 0 and 1 parallel.

4-4-7 Asymmetry inspection

(A) Tools required

(1) Work disk

(2) Users system

(3) Oscilloscope

(B) Inspection and adjustment procedure

(1) Connect the oscilloscope to the READ DATA interface signal line.

Oscilloscope range: DC mode, 2V, 1 μ sec.

(2) Start the spindle motor and load the work disk.

(3) Shift the head to the innermost track.

(4) Record one track with a constant 1F (WRITE DATA frequency for 1.6MB: 125kHz, for 1MB: 67.5kHz).

(5) Measure the asymmetry in accordance with Fig.413.

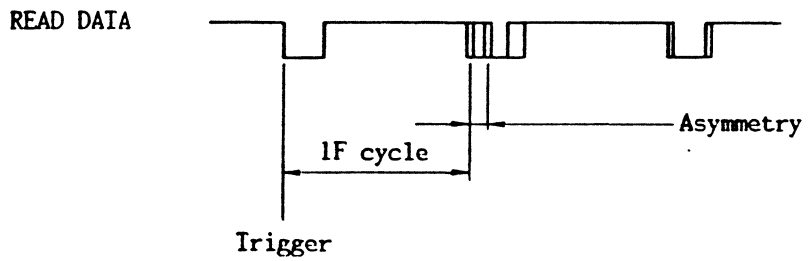


Fig. 413 Asymmetry Measurement

Note: Set so that 3 read data pulses can be observed and measure on the screen of the oscilloscope, and measure the width of the waveform with 2 trigger pulses.

(6) Check if the asymmetry is within the range indicated below.

Innermost track 1F asymmetry: 600nsec. or less (for 1MB)
250nsec. or less (for 1.6MB)

(7) Perform the item (4)~(6) separately for side 0 and side 1.

(8) When the standards of items (6) and (7) are not met, the following are probable causes.

(a) When the concentration of magnetic flux leakage is high around the Floppy Disk Drive:

If there is a magnet, transformer, motor, CRT, magnetized steel plate, etc., near the Floppy Disk Drive, move it away and repeat the asymmetry measurement and adjustment.

(b) Faulty disk: replace the work disk

(c) Faulty head: replace the head carriage assembly in accordance with item 4-5-1.

(d) Faulty main PWB assembly: replace the main PWB assembly in accordance with item 4-5-6.

4-4-8 Read level inspection

(A) Tools required

(1) Level disk

(2) Users system

(3) Oscilloscope

(B) Inspection procedure

(1) Connect the oscilloscope for dual trace to TP6 and TP7 of the main PWB assembly.

Oscilloscope range: AC mode, 0.5V

Set both channels to the above range, put either one of the channels in the invert mode and both channels to ADD.

(2) Start the spindle motor and load the level disk.

(3) Shift the head to the innermost track.

(4) Record one track at a constant 2F frequency (WRITE DATA frequency; for 1.6MB: 250kHz, for 1MB: 125kHz).

(5) Measure the average read level value (Vp-p) in accordance with Fig.414.

(6) Substitute the measured values of item (5) and corrected READ LEVEL value into the following formula:

$$\text{Read level (true value)} = \text{measured value} \times \frac{100}{\text{corrected value}}$$

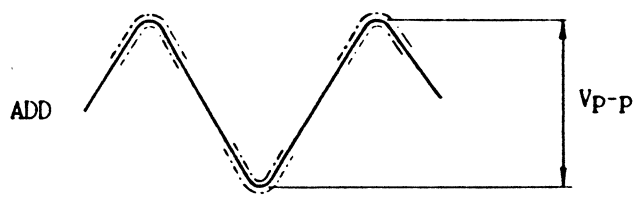


Fig. 414 Average Read Level Measurement(2F)

(7) Check if the true read level value is within the range shown below:

Innermost track read level: { 1 MB 0.2~0.4Vp-p / 1.6MB 0.3~0.7Vp-p }

(8) Perform items (4)~(7) separately for side 0 and side 1.

(9) When the results of items (7) and (8) are not within the indicated range, the following are probable causes:

(a) Disk faulty: replace the disk if it or the disk jacket is bent or damaged.

(b) Disk speed not normal: inspect and adjust in accordance with items 4-4-5.

(c) Faulty head touch: inspect and adjust in accordance with item 4-4-6.

(d) Faulty head: replace the head carriage assembly in accordance with item 4-5-1.

(e) Faulty main PWB assembly: replace the main PWB assembly in accordance with item 4-5-6.

(10) Remove the level disk and cancel the invert and ADD modes of the oscilloscope.

4-4-9 Resolution inspection

(A) Tools required

(1) Level disk

(2) Users system

(3) Oscilloscope

(B) Inspection procedure

(1) Set the oscilloscope for dual trace and connect it to TP1 and TP2 (pre-amp) of the main PWB assembly.

Oscilloscope range: AC mode, 50mV-0.1V

Set both channels to the above range, set either one of the channels to the invert mode and both channels to ADD.

(2) Start the stepping motor and load the level disk.

(3) Shift the head to the innermost track.

(4) Record one track using a constant 1F frequency (WRITE DATA frequency; for 1.6MB: 125kHz, for 1MB: 67.5kHz).

(5) Measure the average read level V1F in accordance with Fig.415.

(6) Record using 2F [double the 1F of item (4)] as in item (4).

(7) Measure the average read level V2F in accordance with Fig.415.

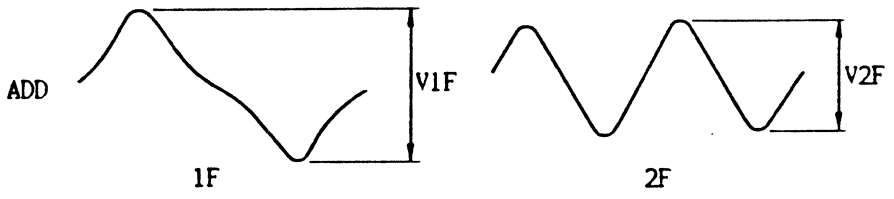


Fig. 415 Resolution Measurement

(8) Substitute the measured values V1F and V2F plus the corrected RESOLUTION value (see the level disk label) into the following formula:

Resolution (true value) = V2F/V1F × 100/corrected value (%)

(9) Check if the true resolution value is within the range shown below.

Innermost track of the resolution: 60% or more

(10) Perform items (4) ~ (9) separately for side 0 and side 1.

(11) When the results of items (9) ~ (10) are not within the indicated range, the following are probable causes:

(a) Disk faulty: replace the disk if it or the disk jacket is bent or damaged.

(b) Disk speed not normal: inspect and adjust in accordance with items 4-4-5.

(c) Faulty head touch: inspect and adjust in accordance with item 4-4-6.

(d) Faulty head: replace the head carriage assembly in accordance with item 4-5-1.

(e) Faulty main PWB assembly: replace the main PWB assembly in accordance with item 4-5-6.

(12) Remove the level disk and cancel the invert and ADD modes of the oscilloscope.

4-4-10 Track alignment inspection and adjustment

(A) Tools required

(1) Crosspoint screwdriver, M3
(2) Alignment disk
(3) Minus screwdriver, medium
(4) Users system
(5) Oscilloscope
(6) Relative humidity meter
(7) Screwlock

(B) Inspection and adjustment procedure

Note: Perform the track alignment inspection and adjustment at normal room temperature and humidity. Avoid extremely low temperatures or extremely low or high humidities even if the Floppy Disk Drive and disk are used under these conditions. Leave the Floppy Disk Drive and disk in a normal environment for 2 hours before starting.

When performing the track alignment inspection, we recommend placing the Floppy Disk Drive in the same position as it is normally used.

(1) Set the oscilloscope for dual trace, and connect it to TP6 and TP7 (differential amp) of the main PWB assembly. Connect the oscilloscope trigger to the INDEX interface signal line (terminal No.8) and apply (-) to the trigger.

Oscilloscope range: AC mode, 0.5V, 20msec

Set both channels to this range, set either channel to the invert mode and set both channels to the ADD mode.

(2) Start the spindle motor and load the disk.

(3) Shift the head to the head alignment track (track 32).

(4) Check if two lobe patterns (VA, VB levels need not coincide) as shown in Fig.416 can be monitored and measured.

When only one lobe pattern can be monitored and measured, or when two lobe patterns are connected, the alignment track position has drifted. In this case, step out four tracks, or step in, and set the track position so that the waveform obtained is

as close as possible to that in Fig.416.

Note: The above track number is used because it is necessary to match the alignment track position with the state of of excitation of the basic excitation phase A of the stepping motor. When the number of tracks shifted is not known, return to track 00 (TRACK 00 output signal is TRUE) and reset.

(5) When the operation of item (4) is completed, step out from 1 to several tracks, shift the head away from the alignment inspection track and measure the VA and VB when the head is again shifted to the alignment inspection track by stepping in.

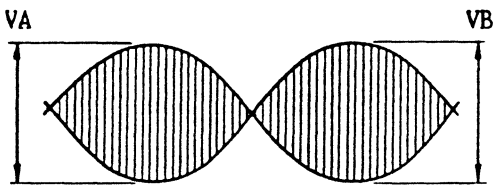


Fig. 416 Lobe Pattern for Alignment Inspection

(6) When the measurement of item (5) is completed, substitute the corrected ALIGNMENT value and the ambient relative humidity (%) in the following formula and calculate the true value of the alignment error:

$$\text{Alignment error (true value)} = \left(\frac{\text{VA-VB}}{\text{VA, VB whichever is larger}} \times 100 - \text{corrected value}\right) - (\text{relative humidity} - 50) \times k$$

k is the humidity compensation factor.

$$k = 0.42$$

Example: VA=0.58(V), VB=0.61(V), corrected value=-6(%), relative humidity 65(%).

$$\text{Alignment error (true value)} = \left\{\frac{0.58-0.61}{0.61} \times 100 - (-6)\right\} - (65 - 50) \times 0.42 \fallingdotseq -5.2(\%)$$

When the result of the calculation is a plus value, the head is inside of the standard position. A minus value indicates that the head is outside of the standard position.

(7) Do the opposite of item (5) and step in from 1 to several tracks, shift the head away from the alignment inspection track and measure VA and VB when the head is stepped out to the alignment inspection track again.

(8) Calculate as in item (6) and find the true value of the alignment error.

(9) Check if the values calculated in items (6) and (8) are within the range shown below.
True value of alignment error: ±25% or less

(10) Perform the operations of items (3) ~ (9) separately for side 0 and side 1.

(11) When the results found in items (9) and (10) are outside the range, adjust the track alignment using the following procedure.
(a) Slightly loosen the screws holding the stepping motor.
(b) As shown in Fig.417, push the tip of a minus screwdriver into the toothed part of the stepping motor from the rear of Floppy Disk Drive.
(c) Repeat step in and step out operations and adjust with a minus screwdriver (rotate the stepping motor only slightly each time) until the alignment error for the alignment inspection track position are minimum both when stepping out and stepping in.

Note: When adjusting while observing the lobe pattern on an oscilloscope, use caution concerning the correction value on the alignment disk and the ambient relative humidity.

(i) When the correction value + (relative humidity - 50) × k ≥ 0:
Adjust the lobe pattern ratio so that the lobe pat-

tern to be corrected VB of the right side is as follows when the left side lobe pattern level VA is set at 1:

$$VB=1-\frac{\text{correction value} + (\text{relative humidity} - 50) \times k}{100}$$

(ii) When the correction value (relative humidity - 50) × k ≤0:

Adjust the lobe pattern ratio so that the lobe pattern VA of the left side is as follows when the right side lobe pattern level VB is set at 1:

$$VA=1-\frac{\text{correction value} + (\text{relative humidity} - 50) \times k}{100}$$

Example: correction value = -6(%), relative humidity 35(%):

$$-6 + (35 - 50) \times 0.42 = -12.3(0$$

$$VA=1 + \frac{-6 + (35 - 50) \times 0.42}{100} \fallingdotseq 0.88$$

The adjustment should be made so that VA is 0.88 when VB is set at 1.

(d) The adjustment should be made so that the alignment error is minimum for both side 0 and side 1.

(e) Tighten the 2 mount screws for the stepping motor in sequence a little at a time and repeat the adjustment until the true value of the alignment error is less than ±20% in either case when the screws have been tightened to the rated torque. The torque for the stepping motor mount screws in 9kg.cm.

(f) Remove the alignment disk.

Apply screwlock to the heads of the stepping motor mount screws.

(g) Inspect and adjust the track 00 sensor in accordance with item 4-4-11.

(h) Inspect and adjust the track 00 stopper in accordance with item 4-4-12.

(12) Cancel the invert and ADD modes of the oscilloscope.

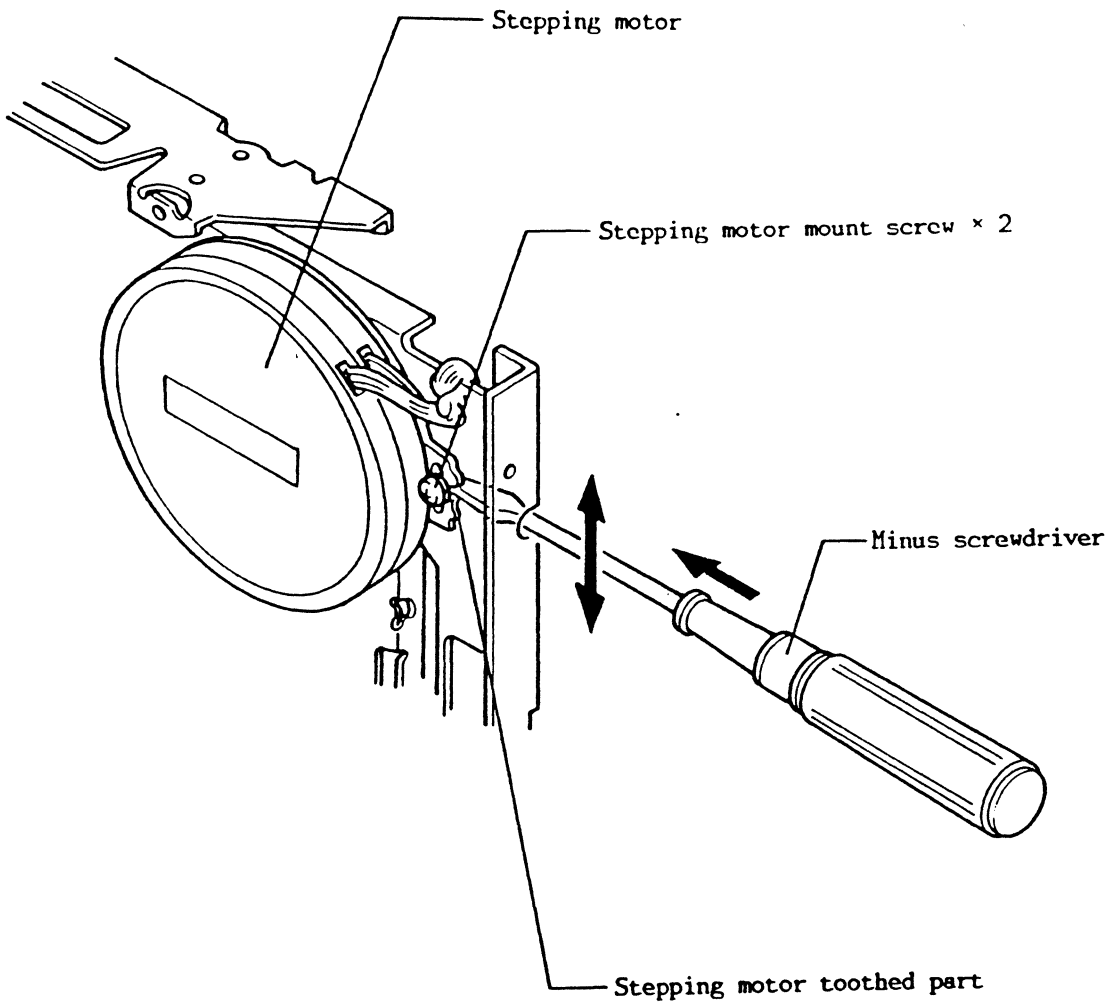


Fig. 417 Track Alignment Adjustment

4-4-11 Track 00 sensor inspection and adjustment

(A) Tools required

(1) Crosspoint screwdriver, M3
(2) Work disk
(3) Alignment disk
(4) Users system
(5) Oscilloscope
(6) Screwlock

(B) Inspection and adjustment procedure

(1) Connect an oscilloscope to TP9 (track 00 sensor) on the main PWB assembly.
Oscilloscope range: DC mode, 1V

(2) Start the spindle motor and insert the work disk.

(3) Check whether or not the voltage at TP9 is 0.5V or less after the head is shifted to track 00.

(4) Shift the head to track 04.

(5) Check whether or not the voltage at TP9 is 3V or more after the head is shifted to track 04.

(6) If the voltages in items (3) and (5) above are not within the specified range, adjust the track 00 sensor position using the following procedure.

(a) Loosen the track 00 stopper mounting screw (refer to Fig.419) and move the stopper in the step-out direction (away from the back part of the head carriage).
(b) Connect the oscilloscope to TP3 or TP4 (differential amp) of the main PWB assembly.
Oscilloscope range: AC mode, 0.2V, 20msec.
(c) Insert the alignment disk. It is assumed, however, that track alignment was correctly performed in item 4-4-10.
(d) Shift the head to a track where a lobe pattern like that shown in Fig.416 can be observed.
(e) Remove the alignment disk.

(f) Connect the oscilloscope to TP9 (track 00 sensor) on the main PWB assembly.

Oscilloscope range: DC mode, 1V.

(g) Step-out the head 30 tracks (track 02) from the position where the correct lobe pattern can be observed.

(h) Insert the work disk.

(i) Shift the head to track 02, loosen the track 00 sensor mounting screw (refer to Fig.418), move the sensor backward and forward, fine adjust to near the intermediate point where the TP9 voltage changes from approximately 0.5V to 3.0V, and then tighten the mounting screw.

Note: Use caution since the TP9 output voltage changes suddenly.

(j) Check items (3)~(5).

(k) After tightening the mounting screw to the specified torque, repeat the adjustment until all of the values in items (i) and (j) are within the specified range.

(l) Apply screwlock to the head of the mounting screw.

(m) Adjust the track 00 stopper as described in item 4-4-12.

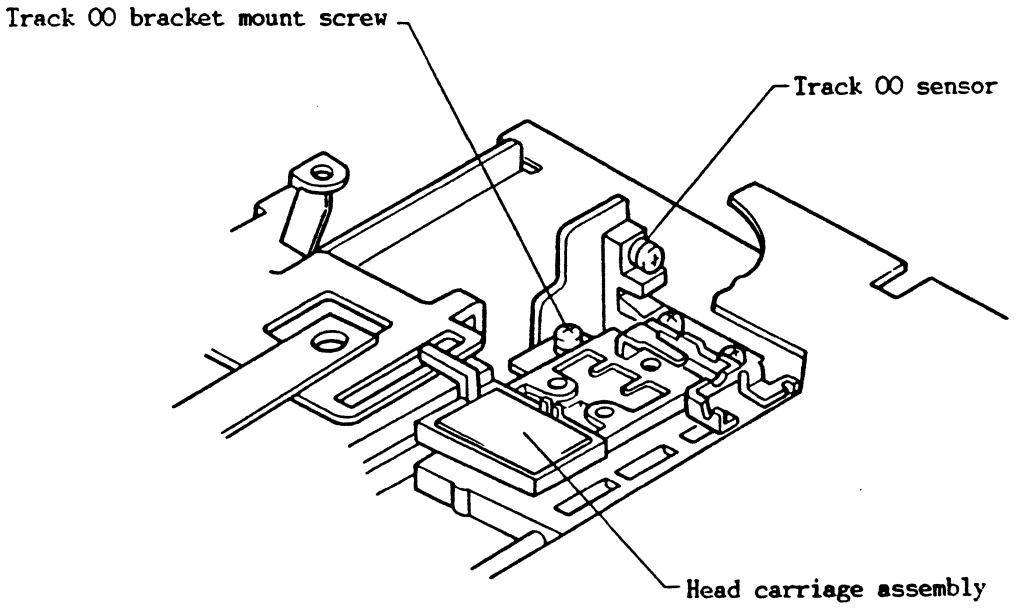


Fig. 418 Track 00 Sensor Adjustment

4-4-12 Track 00 stopper inspection and adjustment

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Users system

(B) Inspection and adjustment procedure

(1) Shift the head to track 00.

(2) Check if there is a very small gap (approx. 0.1~0.4msec.) between the end of the track 00 stopper and the head carriage. (Refer to Fig.419)

(3) Make sure there is no contact between the head carriage and track 00 stopper when the head is moved back and forth repeatedly between track 00 and a place a few tracks inside.

(4) When the conditions of items (2) and (3) are not satisfied, adjust the track 00 stopper position using the following procedure.

(a) Shift the head to track 00.

(b) Replace the track 00 stopper so the gap between the end of the stopper and the head carriage is approximately 0.25mm.

(c) Repeat the procedure given in items (1)~(3).

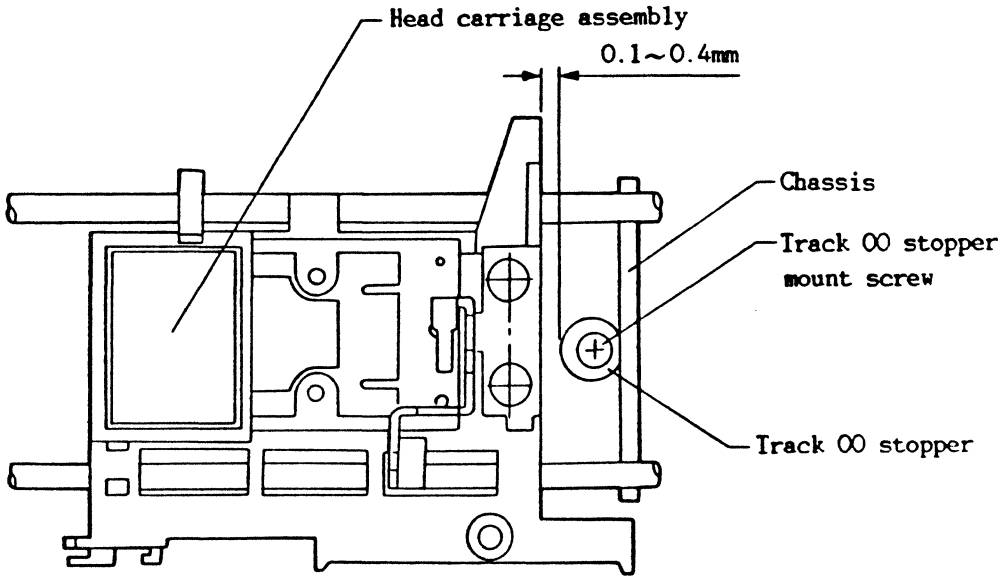


Fig. 419 Track 00 Stopper Adjustment

4-4-13 Index burst timing inspection and adjustment

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Alignment disk

(3) Users system

(4) Oscilloscope

(5) Screwlock

(B) Inspection and adjustment procedure

(1) Use a dual trace oscilloscope. Connect channel 1 to the INDEX interface signal line (terminal No.8) and channel 2 to TP1 or TP2 (pre-amp) of the main PWB assembly. The trigger is (-) and is applied to channel 1.

Set the oscilloscope as follows:

Channel 1: DC mode, 2V, 50 μ sec.

Channel 2: AC mode, 1V, 50 μ sec.

(2) Start the spindle motor and load the alignment disk.

(3) Shift the head to track 02.

(4) Measure t of Fig.420.

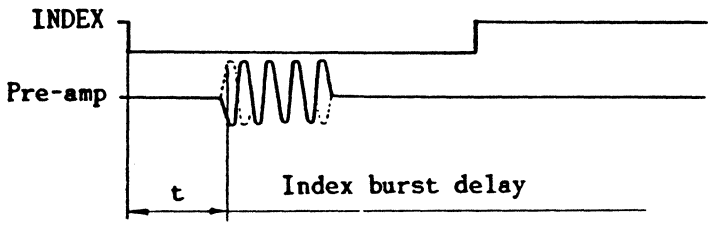


Fig. 420 Index burst timing

(5) Substitute the value measured in item (4) and the INDEX TIMING correction value (refer to the alignment disk label) into the following formula and calculate the true value.

Index burst timing (true value) = measured value - correction value (μ s)

(6) Check if the true value of the index burst timing is within the range 200±200μsec. (for 1MB) and 165±165μsec. (for 1.6MB).

(7) When the value is not within the specified range of item (6), adjust the index sensor position using the folloing procedure.

(a) Loosen the index sensor PWB mount screw (refer to Fig.421) and adjust so that the true value of the index burst timing is within the specified range of the item (6).

(b) After tightening the mount screw to the specified torque of item (6), repeat the adjustment until the true value of the index burst timing is within the specified range.

(c) Coat the head of the mount screw with a small quantity of screwlock.

(8) Remove the alignment disk.

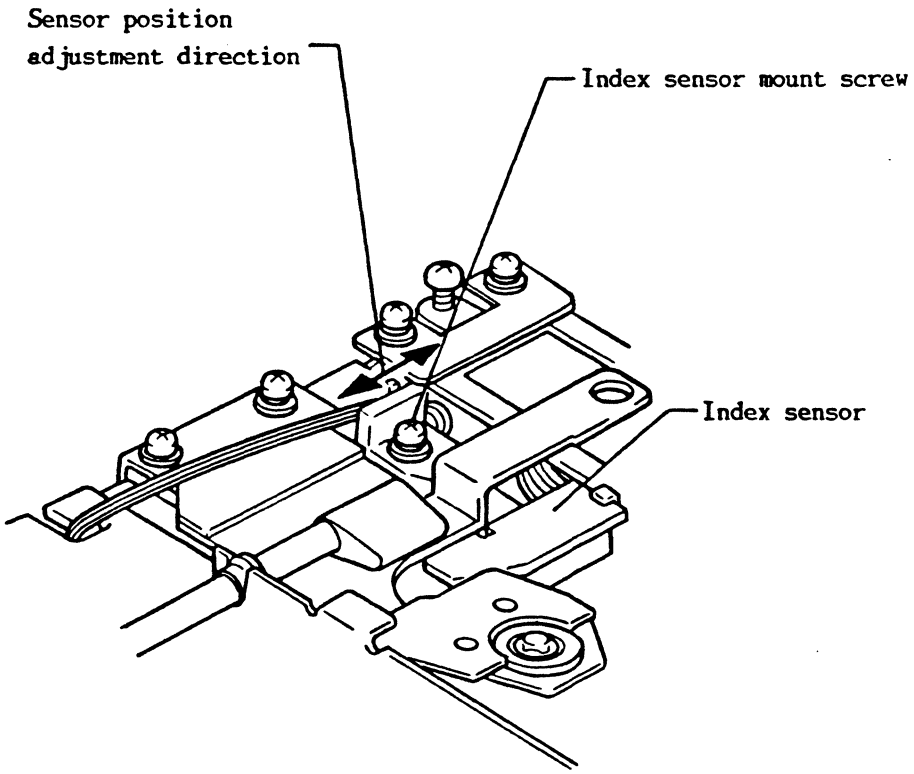


Fig. 421 Index Sensor Adjustment

4-5 How to Replace Parts

4-5-1 Head carriage assembly replacement

(A) Tools required

(1) Crosspoint driver, M3
(2) Crosspoint screwdriver, M2.6
(3) Allen wrench, 1.5mm
(4) Tweezers
(5) Lubricating oil (KANTO KASEI 946P or any equivalent to it)
(6) Alcohol and gauze
(7) Screwlock
(8) Users system

(B) Replacement procedure

(1) Remove the three shield cover (Fig.505, ㉘) mount screws (Fig.505, Ⓢ1) and remove the shield cover.

(2) Remove the three mount screws (Fig.505, Ⓢ8) and lift up the main PWB assembly (Fig.505, ㉕).

(3) Disconnect all connectors to the main PWB assembly and remove it.

(4) Remove the head cable from the U-groove in the disk guide, then from the cord clamper, and pull to the head carriage assembly side (Fig.505, ⑦).

(5) There are two fixing plates connecting the head carriage assembly and the steel belt (Fig.505, ⑩). Grasp band fixing plate B (Fig.505, ⑪) and the head carriage with the fingers and push to disengage the steel belt and band fixing plate B.

(6) Detach band fixing plate B and the band spring (Fig.505, ⑫) from the head carriage assembly at the same time and remove them.

(7) Remove the capstan screw (Fig.505, Ⓢ8) of the stepping motor (Fig.505, ⑥) and remove the band washer (Fig.505, ⑬) and steel belt.

(8) Remove the mount screws (Fig.505, ㉓) and remove the track 00 stopper (Fig.505, ㉔).

(9) There are two guide shaft clips (Fig.505, ⑨) holding the two guide shafts (Fig.505, ⑧). Remove the clip at the rear of the Floppy Disk Drive.

(10) Pull the two guide shafts out toward the back of the Floppy Disk Drive, disengage them from the mounts in the front of the chassis (Fig.505, ①), and then remove the head carriage assembly with the two shafts and the front clip attached. (Refer to Fig.422-1)

(11) Remove the other clip and the two guide shafts from the head carriage assembly.

(12) Prepare the new head carriage assembly and the two new guide shafts.

Note: The guide shafts should be replaced at the same time as the head carriage assembly in order to match the hold diameters. New guide shaft clips should also be used. The guide shafts and head carriage assembly are indicated as one assembly.

(13) Coat the surface of one of the guide shafts with the designated lubricant and install it in the head carriage.

Note: When lubricating the guide shafts, saturate a piece of gauze with the lubricant and wipe it lightly on the guide shaft with a polishing-like motion. Only a light film of lubricant is required.

(14) Coat the other guide shaft with lubricant and install it in the head carriage.

(15) Replace the guide shaft clips in the slots toward the front of the Floppy Disk Drive.

(16) Install the head carriage assembly by reversing the procedure described in items (9) and (10).

Note: The guide shaft clips pre-load both guide shafts, forc-

ing them toward each other, for accurate positioning in the head carriage assembly.

(17) Reverse the procedure described in item (7) and reinstall the steel belt in the capstan section of the stepping motor.

Note: First, carefully clean the surfaces of the steel belt, capstan, etc., with alcohol and gauze.

(18) Reverse the procedures described in items (5) and (6) and reconnect the steel belt in the head carriage assembly, using the band fixing plates A, B and the band spring.

(19) Temporarily fasten the spring that holds the steel belt in the capstan section of the stepping motor.

(20) After moving the head carriage manually several times, carefully tighten the steel belt fastening spring described in item (7) to the specified torque. The belt must be tensioned so that it is perfectly straight. Be careful not to scratch the surfaces of the belt or capstan.

(21) Reverse the procedures described in items (6), (8) for forming the head cable and installing the main PWB assembly.

(22) Reinstall the track 00 stopper (Fig.505, ㉔) using the mount screws (Fig.505, Ⓢ3).

(23) Make the head carriage seek between the innermost track and track 00 and check whether or not the steel belt stays straight.

(24) Inspect the head touch using the procedure described in item 4-4-6.

(25) Inspect the asymmetry using the procedure described in item 4-4-7.

(26) Adjust the track alignment using the procedure described in item 4-4-10.

(27) Adjust the track 00 sensor using the procedure described in item 4-4-11.

(28) Adjust the track 00 stopper using the procedure described in item 4-4-12.

(29) Adjust the index burst timing using the procedure described in item 4-4-13.

(30) Check the read level using the procedure described in item 4-4-8.

(31) Check the resolution using the procedure described in item 4-4-9.

(32) Install the shield cover by reversing the procedure described in item (1).

(33) Connect the Floppy Disk Drive to the system and perform an overall test.

Note: Attaching the guide shaft clips (refer to Fig.422-2.)

(1) Place the head carriage and guide shafts on the mounting section of the chassis.

Caution: *First align the slots in the guide shafts with the bent up parts on the chassis.*

(2) Attach a guide shaft clip (Fig.A, part A) to one of the guide shafts.

(3) Support parts B and C (Fig.A) with the tips of the fingers of both hands (tweezers can also be used with the right hand); next, install by lightly pushing in the Z direction (Fig.A) with both hands at the same time.

Caution:

a. Push part B slightly downward in the Z direction. Do not push strongly and straight downward in the D direction (Fig.A). (The clip is easily bent or lost.)

b. Securely attach the hook on the bottom of the center part on the catch of the

chassis cutout, and firmly insert part C in the groove in the guide shaft.
(Fig.B: completion)

(4) Do the same for the other side. Use the sequence given in (2) and (3).

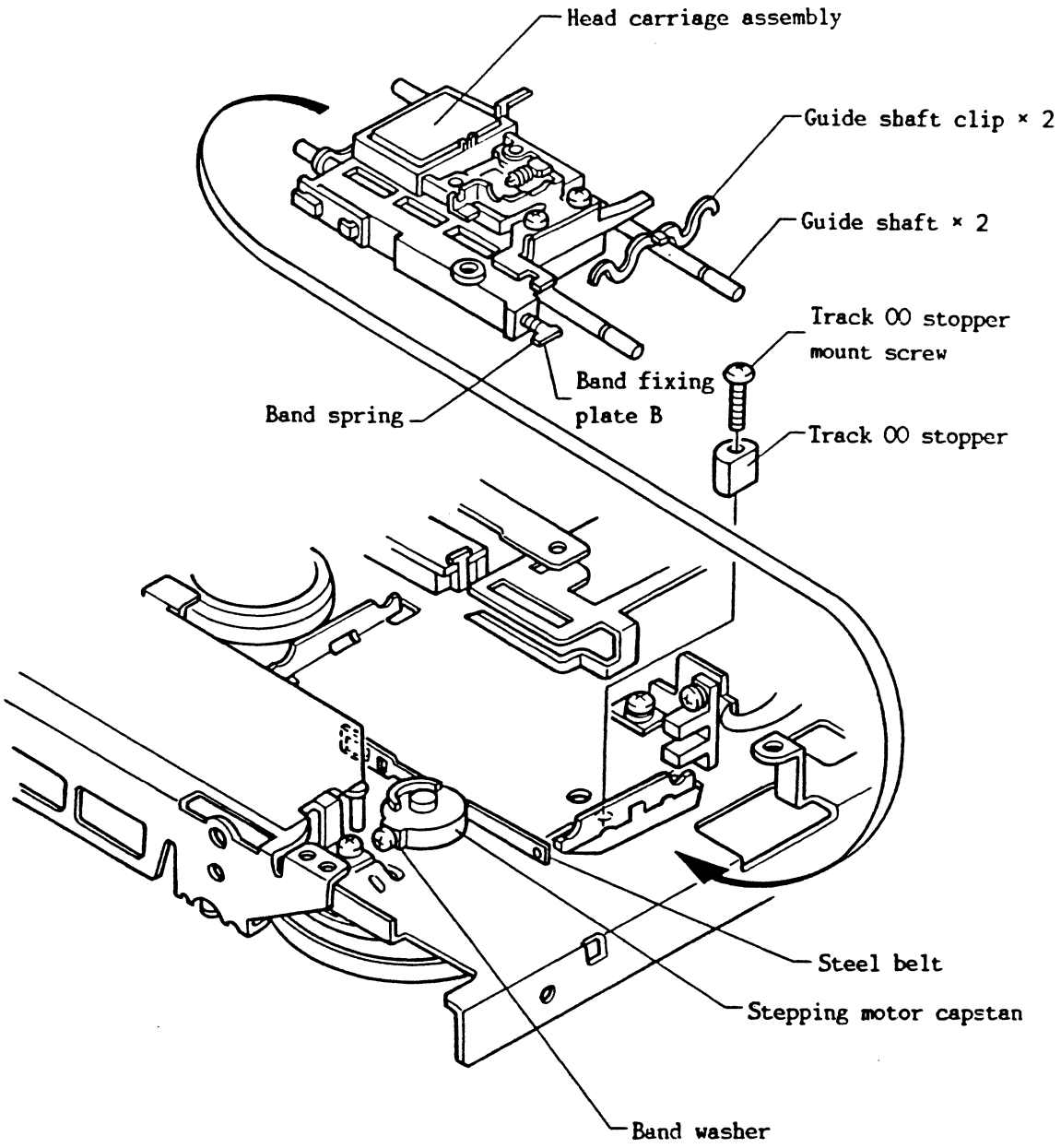


Fig. 422-1 Head Carriage Assembly Replacement

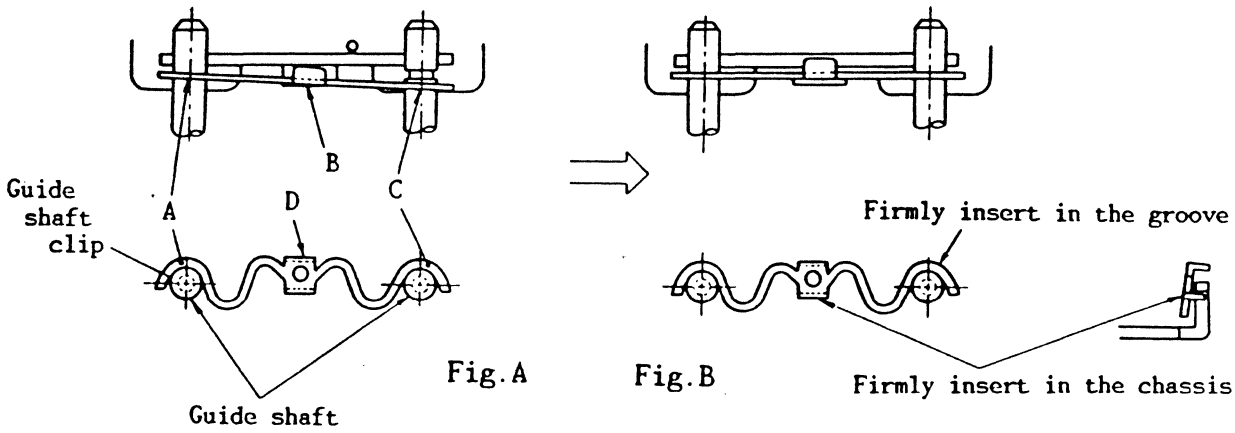


Fig.422-2 Guide Shaft Clips Attaching

4-5-2 Stepping motor and steel belt replacement

(A) Tools required

(1) Crosspoint screwdriver, M3
(2) Crosspoint screwdriver, M2.6
(3) Allen wrench, 1.5mm
(4) Tweezers
(5) Alcohol and gauze
(6) Screwlock
(7) Users system

(B) Replacement procedure

(1) Remove the mount screws (Fig.505, (S1)) and the shield cover assembly (Fig.505, (28)).

(2) Remove the mount screws (Fig.505, (S8)) and lift up the main PWB assembly (Fig.505, (25)).

(3) Disconnect all connectors to the main PWB assembly and remove the main PWB assembly.

(4) The head carriage assembly (Fig.505, (7)) and steel belt (Fig. 505, (10)) are connected by two fastening plates. Press band fixing plate B (Fig.505, (11)) and the lower head carriage to relieve the tension and detach the steel belt from band fixing plate B.

(5) At the same time, remove band fixing plate B and the band spring (FIg.505, (12)) from the head carriage assembly.

(6) Remove the mount screws (Fig.505, (S8)) for the stepping motor (Fig.505, (6)) capstan and remove the band washer (Fig.505, (13)) and steel belt.

(7) Remove the mount screws (Fig.505, (S8)) and stepping motor.

(8) Install the new stepping motor.

(9) Coil the new steel belt and temporarily install the stepping motor capstan with the band washer and mount screws of item (7).

Note: When replacing the stepping motor, the steel belt and band spring should also be replaced at the same time.

(10) Connect the steel belt and the head carriage with band fixing plates A, B and the new band spring, by reversing the procedures described in items (4), (5).

(11) Move the head carriage manually several times, then tighten the steel belt mount screws of item (9) to the specified torque. The belt must be tensioned so that it is perfectly straight. Use care to keep the surfaces of the belt and capstan clean.

(12) Install the main PWB assembly by reversing the procedures described in items (2), (3).

(13) Install the track 00 stopper (Fig.505, ㉕) and mount screws (Fig.505, Ⓢ3).

(14) Make the head carriage seek continuously between track 00 and the innermost track and check whether or not the steel belt stays straight. If not, readjust using the screw in item (9). After adjusting, tighten the screw to the specified torque.

(15) Continue the seeking operation for about 5 minutes.

(16) Install the shield cover assembly and the 3 mount screws.

(17) Adjust the track alignment using the procedure described in item 4-4-10.

(18) Adjust the track 00 sensor using the procedure described in item 4-4-11.

(19) Adjust the track 00 stopper using the procedure described in item 4-4-12.

4-5-3 Disk Drive motor (spindle motor) replacement

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Tweezers

(3) Nippers

(4) Users system

(B) Replacement procedure

(1) Remove the three mount screws (Fig.505, Ⓢ2) and the shield cover assembly (Fig.505, ㉘).

(2) Disconnect the spindle motor connector (J5).

(3) Cut and remove the wire binder (Fig.505, ⑤) used to hold the wiring.

(4) Remove the three mount screws (Fig.505, Ⓢ2 , Ⓢ6) (spindle side) and remove the Disk Drive motor (spindle motor) from the rotor side (PWB side).

(5) Install the new Disk Drive motor (spindle motor) by reversing the procedures described in items (2)~(5).

Note: 1. The spindle section (cups that clamp the disks) of the Disk Drive motor (spindle motor) are precision processed. When installing the motor in the chassis, so the spindle is parallel to the chassis and insert slowly and carefully. Use extreme caution to avoid scratching the surfaces of the spindle.

2. Make sure that collar B (Fig.505, ④) does not drop when the mount screws are removed from the disk loading side.

(6) Adjust the position of the collet assembly (Fig.505, ㉑) using the procedure described in item 4-4-1. Fasten the cable to the Disk Drive motor (spindle motor) with a new wire binder.

(7) Tie the cable of Disk Drive motor (spindle motor) with the new wire binder to the chassis.

(8) Check the file protect sensor using the procedure described in item 4-4-4.

(9) Adjust the disk speed using the procedure described in item 4-4-5.

(10) Inspect and adjust the track alignment using the procedure described in item 4-4-10.

(11) Inspect and adjust the index burst timing using the procedure described in item 4-4-13.

(12) Install the shield cover assembly and the 3 mount screws by reversing the procedure described in item (1).

4-5-4 Collet assembly replacement

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Tweezers

(3) Screwlock

(4) Users system

(5) Lubricant (NIPPON KOYU LTD. HH-17 or any equivalent to them.)

(B) Replacement procedure

(1) Remove the 3 mount screws (Fig.505, (S1)) and the shield cover assembly (Fig.505, (28)).

(2) Set the front lever for clamping. (For double side types, insert felt, etc., between the carriage and upper arm to prevent contact of the upper and lower heads.)

(3) Remove the E-ring (Fig.505, (S11)) from the clamp holder assembly (Fig.505, (20)). After releasing the clamp, remove the collet assembly (Fig.505, (21)) together with the washer (Fig.505, (S13)) and pressure spring (Fig.505, (22)).

(4) Install the new collet assembly, washer and pressure spring by reversing the removal procedures. Coat the surfaces of the clamp holder and collet center (refer to Fig.406-c) with lubricant and loosely tighten the clamp holder assembly mount screws.

(5) Adjust the position of the center of the collet assembly using the procedure described in item 4-4-1 and tighten the mount screws to the specified torque.

(6) Inspect and adjust the track alignment using the procedure described in item 4-4-10.

(7) Install the shield cover assembly by reversing the procedure described in items (1).

4-5-5 Track 00 block assembly replacement

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Tweezers

(3) Screwlock

(4) Users system

(B) Replacement procedure

(1) Disconnect the track 00 connector (J3).

(2) Remove the mount screws (Fig.505, ⑧) and the track 00 block assembly (Fig.505, ⑮).

(3) Install the new track 00 block assembly by reversing the removal procedure. (Only loosely tighten the track 00 block assembly mount screws.)

(4) Adjust the track 00 sensor using the procedure described in item 4-4-11.

(5) Adjust the track 00 stopper using the procedure described in item 4-4-12.

4-5-6 Main PWB assembly replacement

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Users system

(B) Replacement procedure

(1) Remove the 3 mount screws (Fig.505, ⓢ1) and the shield cover assembly (Fig.505, ㉘).

(2) Remove the 3 mount screws (Fig.505, ⓢ8) and lift up the main PWB assembly (Fig.505, ㉕).

(3) Disconnect all connectors and remove the main PWB assembly.

(4) Install the new main PWB assembly by reversing the removal procedure.

(5) Set the PWB strap in the same way as for the previous PWB.

(6) Check the asymmetry using the procedure described in item 4-4-7.

(7) Check the read level using the procedure described in item 4-4-8.

(8) Check the resolution using the procedure described in item 4-4-9.

(9) Check the track 00 sensor using the procedure described in item 4-4-11.

(10) Replace the shield cover assembly by reversing the procedure described in items (1).

(11) Connect the Floppy Disk Drive to the system and perform an overall test.

4-5-7 Sensor block assembly replacement

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Allen wrench, 1.5mm

(3) Screwlock

(4) Users system

(B) Replacement procedure

(1) For the left lever

(a) Remove the 3 mount screws (Fig.505, (S1)) and the shield cover assembly (Fig.505, (28)).

(b) Turn the front lever assembly (Fig.505, (27)) to the closed position and remove the mount screw (Fig.505, (S10)).

(c) Turn the front lever to the open position and remove the front lever assembly.

(d) Remove the 2 mount screws (Fig.505, (S9)) and the front bezel (Fig.505, (26)).

(e) Remove the E-ring (Fig.505, (S11)) and the clamp cam assembly (Fig.505, (23)). (Use a new E-ring for reassembly.)

(f) Remove the 2 mount screws (Fig.505, (S7)) and the clamp holder assembly (Fig.505, (20)).

(g) Disconnect the sensor block connector (J6).

(h) Remove the 3 mount screws (Fig.505, (S8) , (S9)) and the sensor block assembly (Fig.505, (19)).

(i) Install the new sensor block assembly by reversing the procedures described in items (f)~(h).

(j) Adjust the collet center position using the procedure described in itesm 4-4-1.

(k) Adjust the file protect sensor using the procedure described in item 4-4-4.

(l) Adjust the index burst timing using the procedure described in item 4-4-13.

(m) Install the front bezel and front lever by reversing the procedures described in items (b)~(d).

(n) Adjust the front lever position using the procedures described in item 4-4-2.

(o) Install the shield cover assembly by reversing the procedure described in item (a).

4-5-8 Front bezel replacement

(A) Tools required

(1) Crosspoint screwdriver, M3

(2) Allen wrench, 1.5mm

(B) Replacement procedure

(1) Turn the front lever (Fig.505, ㉗) to the closed position and remove the mount screw (Fig.505, Ⓢ10).

(2) Turn the front lever to the open position and remove the front lever assembly.

(3) Remove the mount screws (Fig.505, Ⓢ9) and remove the front bezel (Fig.505, ㉖) by pulling it forward.

(4) Install the new front bezel by reversing the removal procedure.

Note: When installing the front bezel, be sure the 4 arms that mount and support the upper and lower chassis (Fig.505,①, ⑯). Press both sides of the bezel against the chassis and tighten the mount screws to the specified torque.

(5) Adjust the position of the front lever using the procedure described in item 4-4-2.

4-5-9 Front lever assembly replacement

(A) Tools required

(1) Allen wrench, 1.5mm

(B) Replacement procedure

(1) Turn the front lever (Fig.505, ㉗) to the closed position and remove the mount screw (Fig.505, Ⓢ10).

(2) Turn the front lever to the open position and remove the front lever assembly.

(3) Install the new front lever assembly by reversing the removal procedure.

Note: When installing the front lever assembly, be sure to align the lever lot with the pin on the lever shaft.

(4) Adjust the position of the front lever using the procedure described in item 4-4-2.

4-5-10 Clamp cam assembly replacement

(1) Tools required

(a) Allen wrench, 1.5m

(b) Crosspoint screwdriver, M3

(c) Tweezers

(d) Lubricant (NIPPON KOYU LTD. HH-17 or any equivalent to them)

(2) Replacement procedure

(a) Turn the front lever (Fig.505, ㉗) to the closed position and remove the mount screw (Fig.505, Ⓢ10).

(b) Turn the front lever to the open position and remove the front lever assembly.

(c) Remove the mount screws (Fig.505, Ⓢ9) and remove the front bezel (Fig.505, ㉖) by pulling it forward.

(d) Remove the door lock spring, remove the E-ring(Fig.505, Ⓢ11), and remove the clamp cam assembly (Fig.505, ㉓).

(e) Install the new clamp cam assembly by reversing the removal procedure. Adjust the play of the clamp shaft to 0.05~0.2mm by using washers (Fig.505, Ⓢ12). Coat the part that contacts the clamp cam and clamp holder(Fig.505, ⑳) with lubricant.

(f) Install the front bezel and front lever by reversing the procedure described in items (a)~(c).

(g) Adjust the position of the front lever using the procedure described in item 4-4-2.

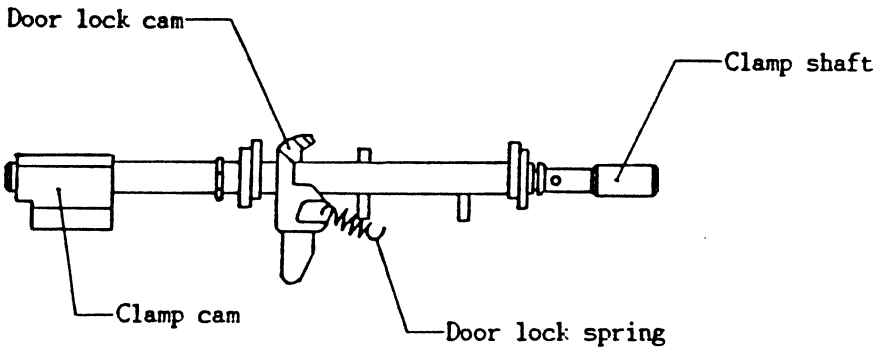


Fig. 423 Clamp Cam Assembly Replacement

SECTION 5

DRAWINGS AND PARTS LISTS

5-1 Construction

The F-5006, F-5008 include the following main components. (Refer to Fig.501~Fig.504) For a detailed parts breakdown, see items 5-2 and 5-3.

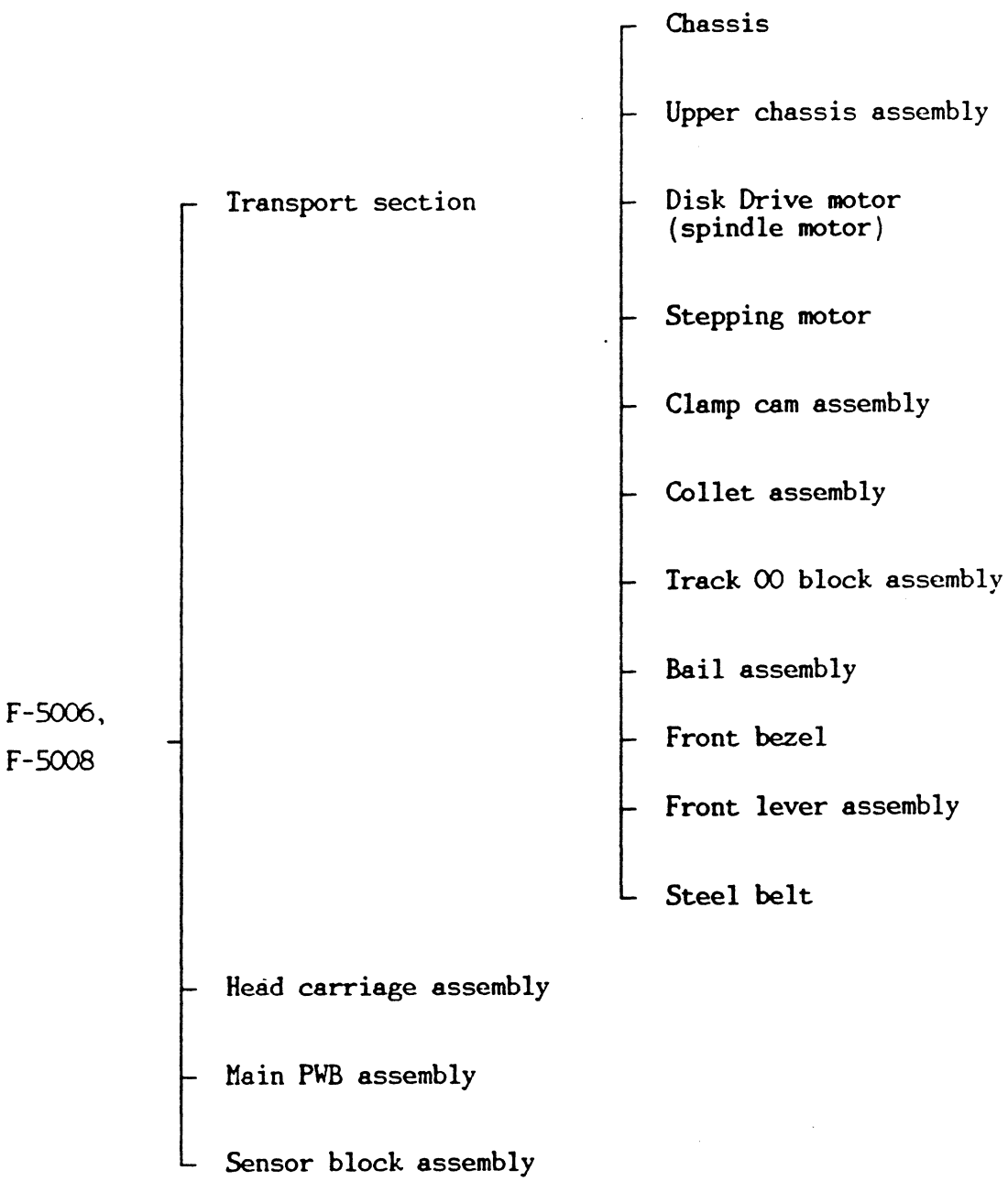


Table 501 F-5006, F-5008 Main Components Chart

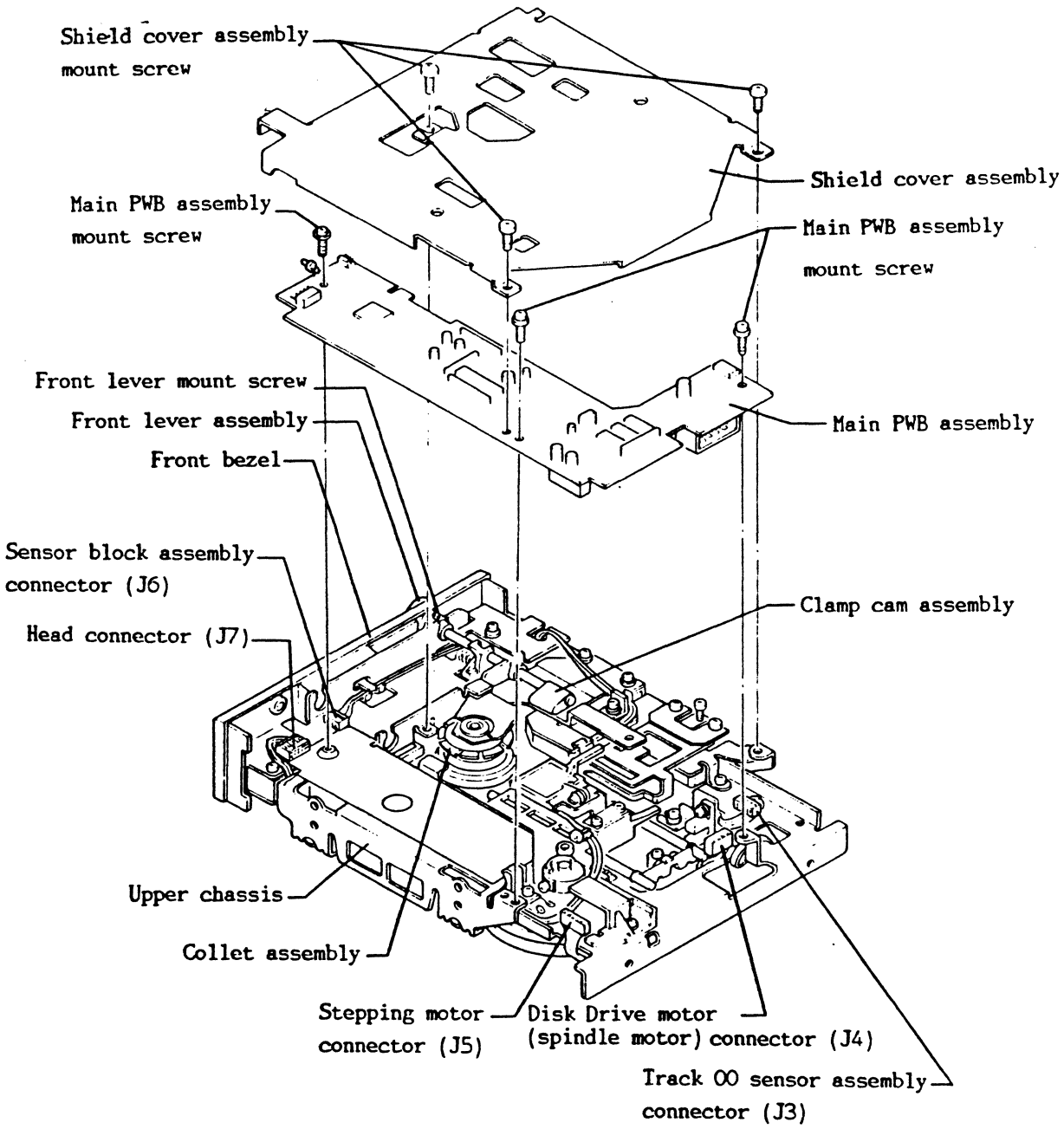


Fig. 501 External Appearance Drawing (1)

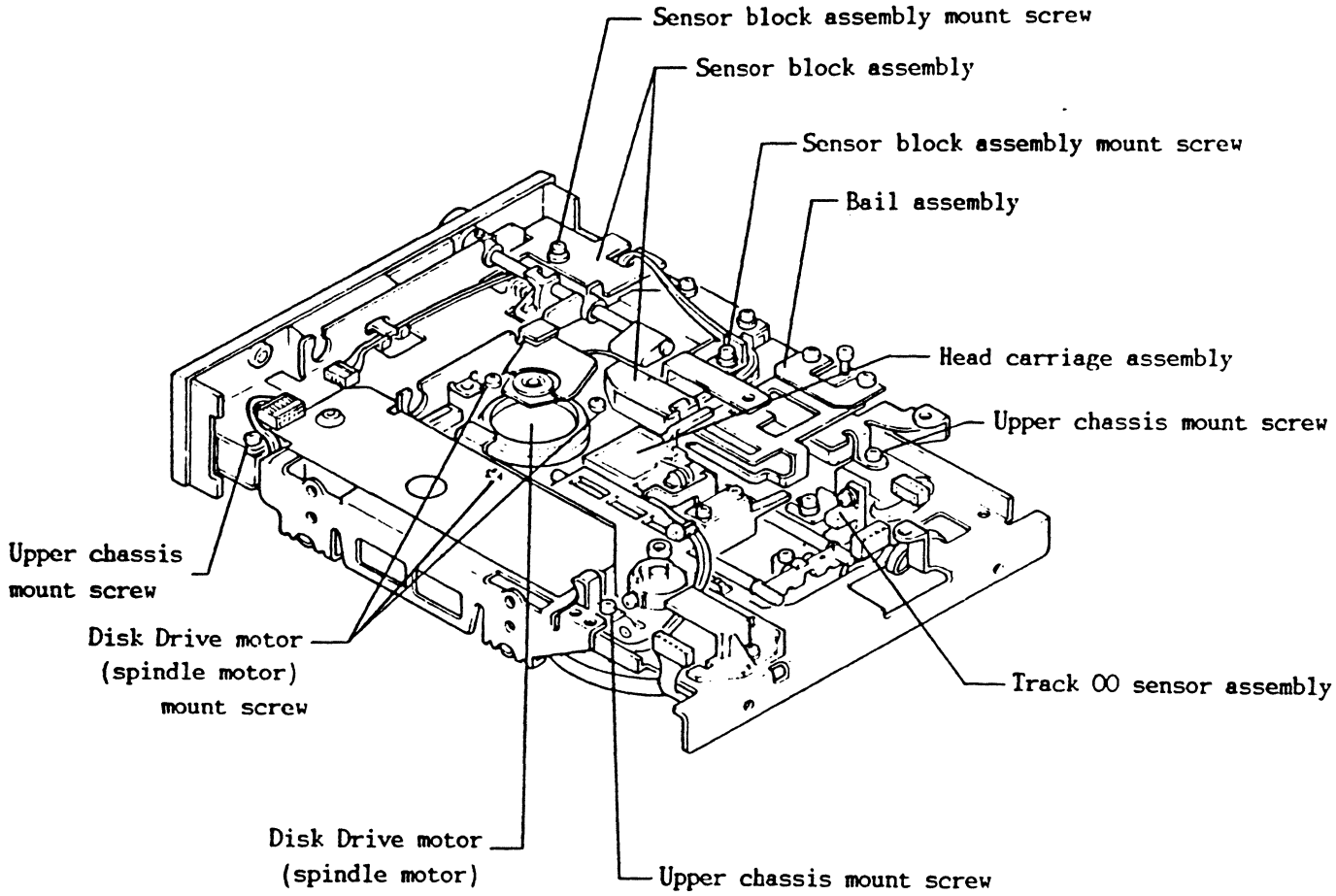


Fig. 502 External Appearance Drawing (2)

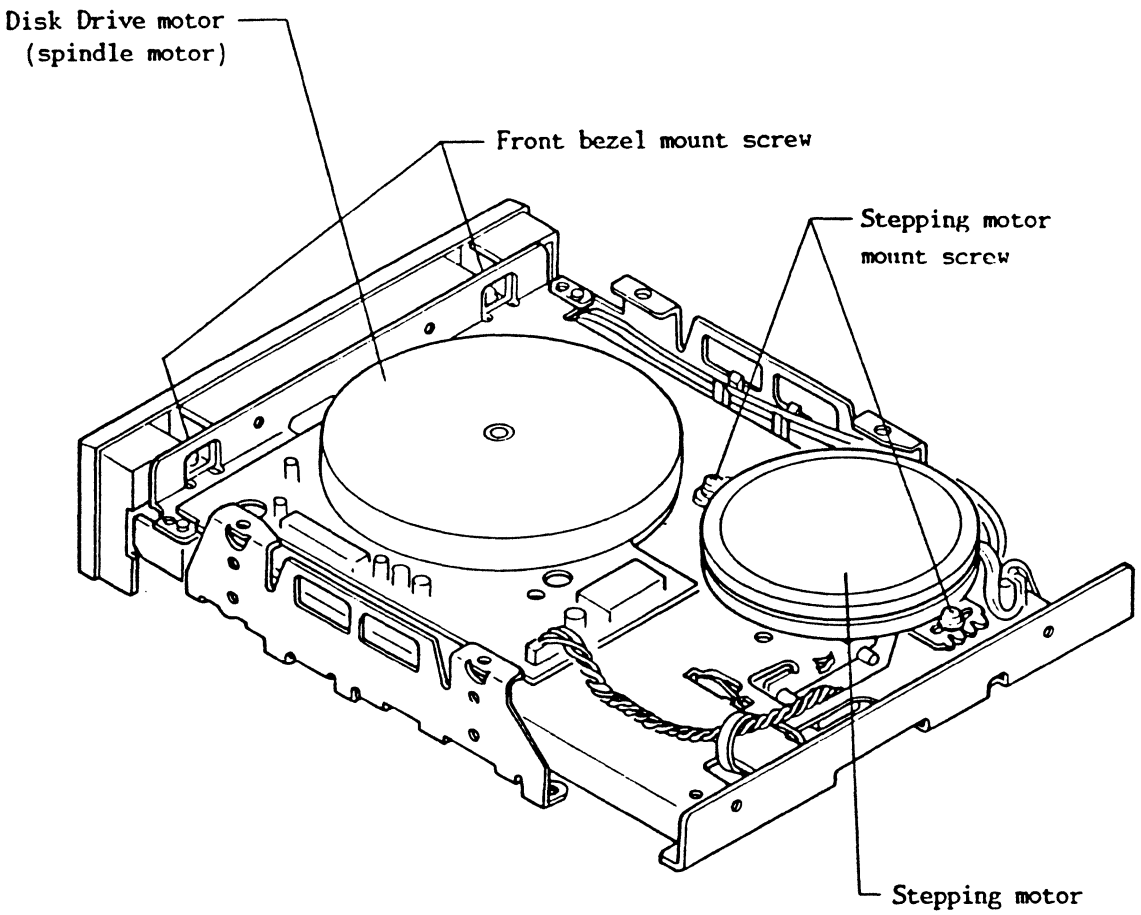


Fig. 503 External Appearance Drawing (3)

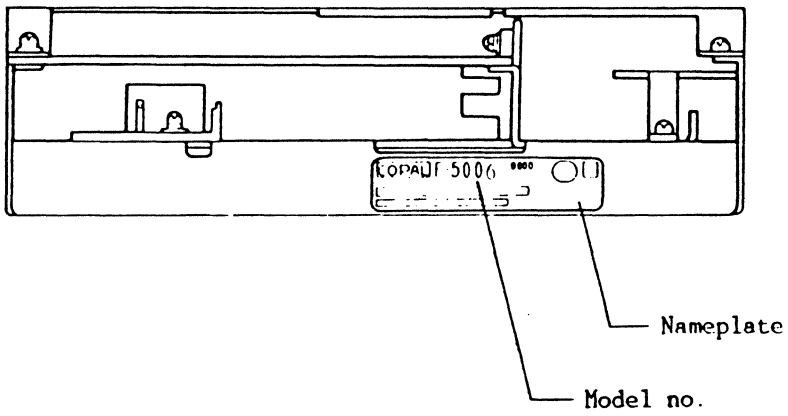


Fig. 504-1 External Appearance Drawing (4)

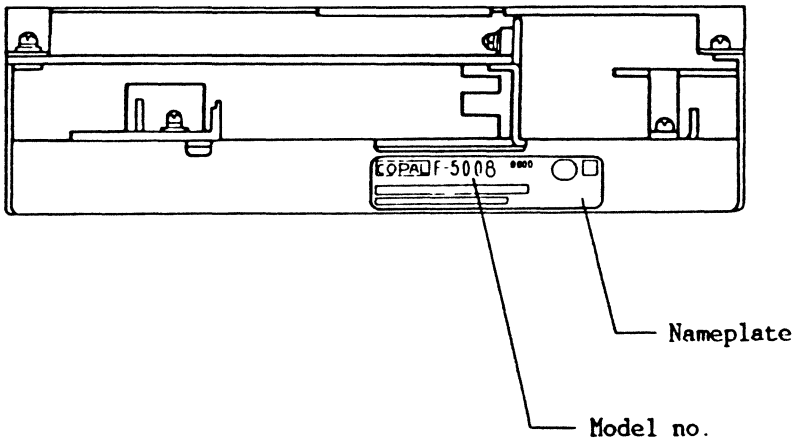


Fig. 504-2 External Appearance Drawing (4)

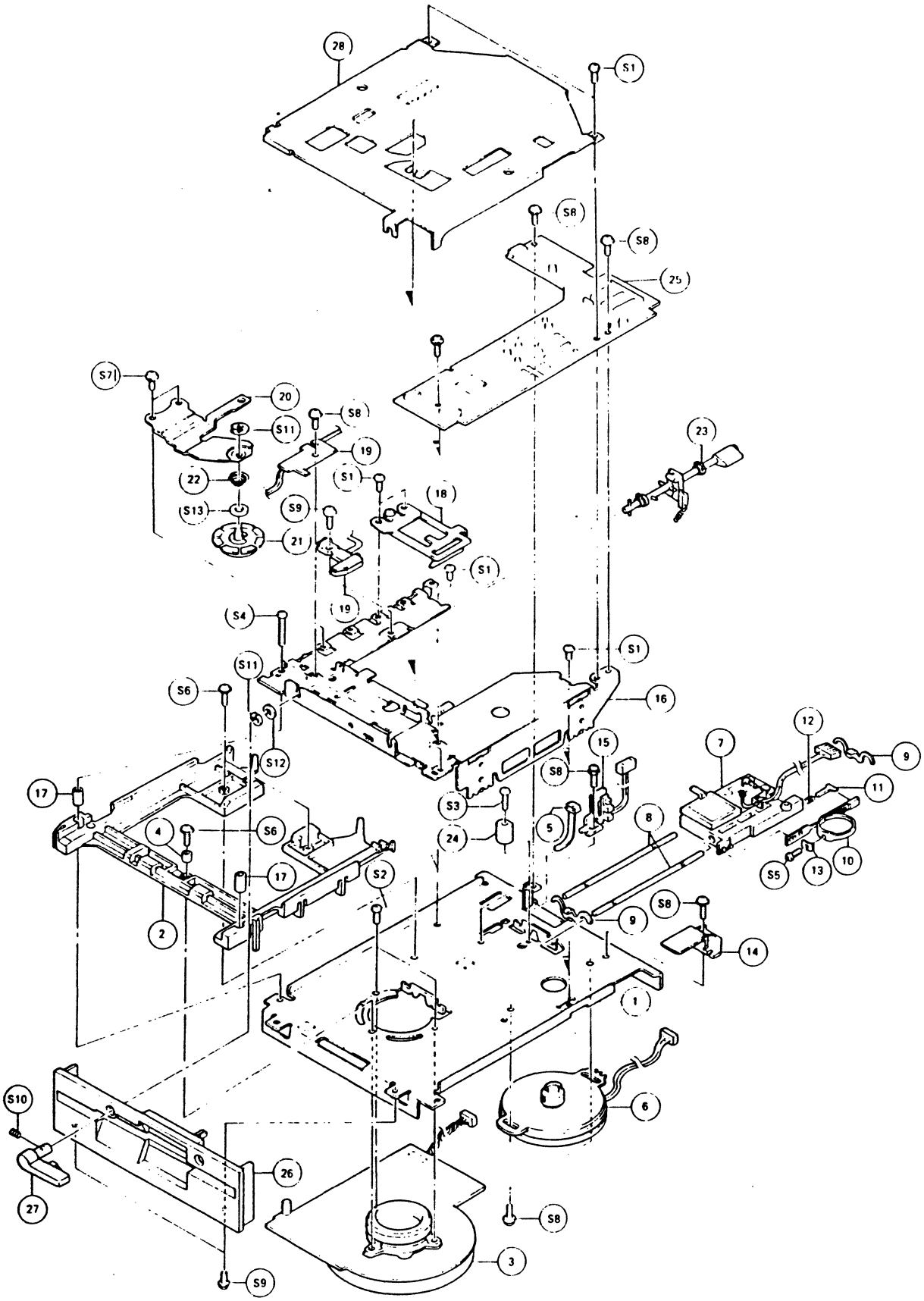


Fig. 505 Exploded Drawing

5-2 Structural Parts Exploded Drawing, Parts List

5-2-1 Floppy Disk Drive chassis F-5006

Part no.	Drawing no.	Parts Name	Q'ty	Remarks	
1	J2-5071	Chassis	1		
2	J2-5073	Disk guide	1		
3	J3-5153	Disk Drive motor (spindle motor)	1	790P8	
4	J4-5114	Collar B	1		
5	G4-11830	Wire binder	1		
6	J3-5174	Stepping motor	1	SH-65	
7	JA3-5181	Head carriage assembly	1	See Notes 1.	
8	J4-5033	Guide shaft	2		
9	J4-5244	Guide shaft clip	2		
10	JA3-5398	Steel band assembly	1		
11	J4-5030	Band fixing plate B	1		
12	J4-5031	Band spring	1		
13	J4-5032	Band washer	1		
14	J4-5261	Cable support	1		
15	JA4-5414	Track 00 block assembly	1		
16	JA3-5185	Upper chassis assembly	1		
17	J4-5310	Collar	2		
18	JA3-5075	Bail assembly	1		
19	JA4-5409	Sensor block assembly	1		
20	JA4-5308	Clamp holder assembly	1		
21	JA3-5079	Collet assembly	1		
22	J4-5253	Pressure spring	1		
23	JA4-5419	Clamp cam assembly	1		
24	J4-5287	Track 00 stopper	1		
25	JA2-5159	Main PWB assembly	1	See Notes 2.	
26	J2-5158	Front bezel	1	See Notes 3.	
27	JA4-5424	Front lever assembly	1		
28	JA3-5186	Shield cover assembly	1		

Floppy Disk Drive chassis F-5008

Part no.	Drawing no.	Parts Name	Q'ty	Remarks	
1	J2-5071	Chassis	1		
2	J2-5073	Disk guide	1		
3	J3-5152	Disk Drive motor (spindle motor)	1	790P7	
4	J4-5114	Collar B	1		
5	G4-11830	Wire binder	1		
6	J3-5174	Stepping motor	1	SH-65	
7	JA3-5181	Head carriage assembly	1	See Notes 1.	
8	J4-5033	Guide shaft	2		
9	J4-5244	Guide shaft clip	2		
10	JA3-5398	Steel band assembly	1		
11	J4-5030	Band fixing plate B	1		
12	J4-5031	Band spring	1		
13	J4-5032	Band washer	1		
14	J4-5261	Cable support	1		
15	JA4-5414	Track 00 block assembly	1		
16	JA3-5185	Upper chassis assembly	1		
17	J4-5310	Collar	2		
18	JA3-5075	Bail assembly	1		
19	JA4-5409	Sensor block assembly	1		
20	JA4-5308	Clamp holder assembly	1		
21	JA3-5079	Collet assembly	1		
22	J4-5253	Pressure spring	1		
23	JA4-5419	Clamp cam assembly	1		
24	J4-5287	Track 00 stopper	1		
25	JA2-5170	Main PWB assembly	1	See Notes 2.	
26	J2-5158	Front bezel	1	See Notes 3.	
27	JA4-5424	Front lever assembly	1		
28	JA3-5186	Shield cover assembly	1		

Notes: 1. *The guide shaft should be replaced at the same time as the head carriage assembly in order to match the hold diameters. New guide shaft clips should also be used. The guide shafts and head carriage assembly are indicated as one assembly.*

2. *The main PWB assembly version number differs for each type of machine so look at the nameplate on the PWB to make sure the correct ISSUE is used.*

3. *The diagram numbers of the front bezel assembly and front lever assembly are written in standard black.*

5-2-2 Screws and washers

Part no.	Drawing no.	Part Name	Remarks	
S1	9020-3004	Screw M3 × 4		
S2	9020-3006	Screw M3 × 6		
S3	9020-3070	Screw M3 × 10		
S4	9020-3016	Screw M3 × 16		
S5	9065-2604	Screw M2.6 × 4		
S6	9061-3008	Screw M3 × 8		
S7	9066-3004	Screw M3 × 4		
S8	9066-3006	Screw M3 × 6		
S9	9066-3008	Screw M3 × 8		
S10	JZ4-0028	Screw M3 × 3		
S11	9820-0300	E-ring ϕ3		
S12	JZ4-0019B	Washer 4.1 × 0.2	For adjusting	
	JZ4-0019C	Washer 4.1 × 0.35		
S13	JZ4-0018	Washer ϕ5.1 × 0.3		

Screw and Washer Parts List

5-3 PWB Assembly Parts & Drawing No. List

5-3-1 Main PWB Assembly

Drawing No.	Parts Name	Q'ty	Parts No.	
JY4-0136	IC CX-20185	1	IC9	
JY4-0137	IC FDDP (JPH1009FN)	1	IC10	
JY4-0138	TTL IC MB74LS08	1	IC5	
JY4-0529	M74LS08P			
JY4-0530	HD74LS08			
JY4-0139	MB74LS14	2	IC1,2	
JY4-0531	M74LS14P			
JY4-0532	HD74LS14			
JY4-0140	MB74LS74A	1	IC7	
JY4-0533	M74LS74AP			
JY4-0534	HD74LS74A			
JY4-0100	MB74LS123	1	IC8	
JY4-0535	M74LS123P			
JY4-0536	HD74LS123			
JY4-0101	M53238P	2	IC3,4	
JY4-0537	HD7438			
JY4-0005	IC M54578	1	IC6	
JY4-0141	Resistance type transistor DTC-114EF	8	Q1,2,4,5, 6,7,11,12	
JY4-0142	DTA-114EF	1	Q10	
SAXR08812Q	Transistor 2SA881 (Q,R)	1	Q3	
SCXR20212R	2SC2021LN (R,S)	2	Q8,9	
JY4-0067A	Diode 1SS138 P=5mm	2	CR1,2	
JY4-0143	Pair diode MA156	2	CRA1,2	

Drawing No.	Parts Name	Q'ty	Parts No.	
JY4-0036	Pair diode MA154WK	1	CRA3	
JY4-0068A	Tuner diode MTZ6.8 A,B,C	1	ZD1	
JY4-0084	LED GL-5RP5	1	LED1	
CEMK1C226K CEME1C226K	Electrolytic capacitor 22μF 16V H=7mm	1	C3	
CEMK1C106K CEME1C106K	10μF 16V H=7mm	1	C2	
CEMK1E475K CEME1E475K	4.7μF 25V H=7mm	1	C19	
CEMK1V335K CEME1V335K	3.3μF 35V H=7mm	1	C18	
CEMK1H334K CEME1H334K	0.33μF 50V H=7mm	3	C37,38,39	
CEMK1A107K CEME1A107K	100μF 10V H=7mm	1	C35	
CNKE1V905K	9μF 35V BP H=7mm	2	C16,17	
CEMK1H105K CEME1H105K	1μF 50V H=7mm	1	C15	
CFGY1H151N	Polypropylene capacitor 150PF G 50V	2	C28,29	
CFGY1H241N	240PF G 50V	2	C26,27	
CFGY1H103N	1000PF G 50V	1	C32	
CKZY2H103F	Ceramic capacitor 103Z 500V P=5mm	1	C1	
CKZY1H223F	223Z 50V P=5mm	7	C4,6,7,8, 11,12,33	
CKZY1H333F	333Z 50V P=5mm	2	C24,25	
CKZY1H103F	103Z 50V P=2.5mm	1	C34	

Drawing No.	Parts Name	Q'ty	Parts No.	
CKKY1H102B	Ceramic capacitor 102K 50V P=2.5mm	1	C36	
CCJX1H300X	30PF J 50V SL P=2.5mm	2	C13,14	
CBMY1E104A	Semiconductor ceramic capacitor 104M 25V P=5mm	5	C20,22,23, 30,31	
RDJR23151A	Carbon resister 150 J 1/5W P=5mm	1	R2	
RDJR23201A	200 //	2	R36,37	
RDJR23221A	220 //	2	R5,48	
RDJR23331A	330 //	2	R11,19	
RDJR23431A	430 //	1	R42	
RDJR23561A	560 //	1	R47	
RDJR23102A	1K //	5	R10,27,38, 39,43	
RDJR23222A	2.2K //	2	R6,7	
RDJR23242A	2.4K //	2	R28,29	
RDJR23272A	2.7K //	1	R44	
RDJR23302A	3K //	4	R32,33,34, 35	
RDJR23362A	3.6K //	1	R26	
RDJR23472A	4.7K //	11	R3,4,12, 13,14,15, 25,40,41, 45,49	
RDJR23513A	51K //	2	R30,31	
RDJR23104A	100K //	1	R1	
RDJR23244A	240K //	1	R46	
RNFRF3001A	Metal film resister 3.00K F 1/5W P=5mm	1	R21	
RNFRF4121A	4.12K //	1	R20	
RNFRF2942A	29.4K //	1	R17	
RNFRF2432A	24.3K //	1	R18	
RNFRF2742A	27.4K //	1	R16	

Drawing No.	Parts Name	Q'ty	Parts No.	
RSJF30561C	Metal oxide film resister 560 J 1W	1	R23	
RSJF30511C	510 〃	1	R22	
RSJF30221C	220 〃	1	R24	
RSJF30390C	39 〃	2	R8.9	
JY4-0144	DIP type resistance array 150 J × 8	1	RA1	
JY4-0145	DIP type IC socket 16P	1		
JY4-0146	Ceramic oscillator 4MHZ	1	X1	
JY4-0147	Actual read inductor 680μH K	2	L4,5	
JY4-0148	100μH K	1	L3	
JY4-0149	Radial read type filter	2	L1,2	
JY4-0150	Block header (right angle) 12P	1	J7	
JY4-0080C	Post with base (right angle) 4P	2	J3,6	
JY4-0023D	Post with base (straight angle) 5P	1	J4	
JY4-0023E	6P	1	J5	
JY4-0078	Power connector 4P & band	1	J2	
JY4-0514 JY4-0515	Power connector 4P Band for 4P power connector			
JY4-0021 JY4-0022	Power connector 4P Band for 4P power connector			
JY4-0076E	Shorting connector 2 row 10P	1	DS	
JY4-0151C	1 row 3P	2	LED SEL LSP, DTS SEL	
JY4-0151B	1 row 2P	1	MOFD	

Drawing No.	Parts Name	Q'ty	Parts No.	
JY4-0077	Shorting pin Receptacle	4	for F5006	
JY4-0077	Shorting pin Receptacle	5	for F5008	
JY4-0018B	Shorting connector 1 row 7P	1	TP1～7	
JY4-0018D	1 row 2P	1	TP8,9	

5-4 Circuit Diagram

Cautions concerning the circuit diagram

(1) Unless otherwise indicated, resistances (R) are given in ohms with a voltage rating of 1/6W and tolerance of ±5% (J).

(2) Unless otherwise indicated, resistance arrays (RA) are given in ohms with a voltage rating of 1/5W and tolerance of ±5% (J).

(3) Unless otherwise indicated, capacitors (C) are rated in picofarads (PF) with a voltage rating of 50V.

Example : 223Z → 22×10^{3}PF=22000PF +80% ~ -20%

(4) Tolerances for resistances, resistance arrays and capacitors are coded as follows. G: ±2%; K: ±10%; M: ±20%; Z: +80% ~ -20%

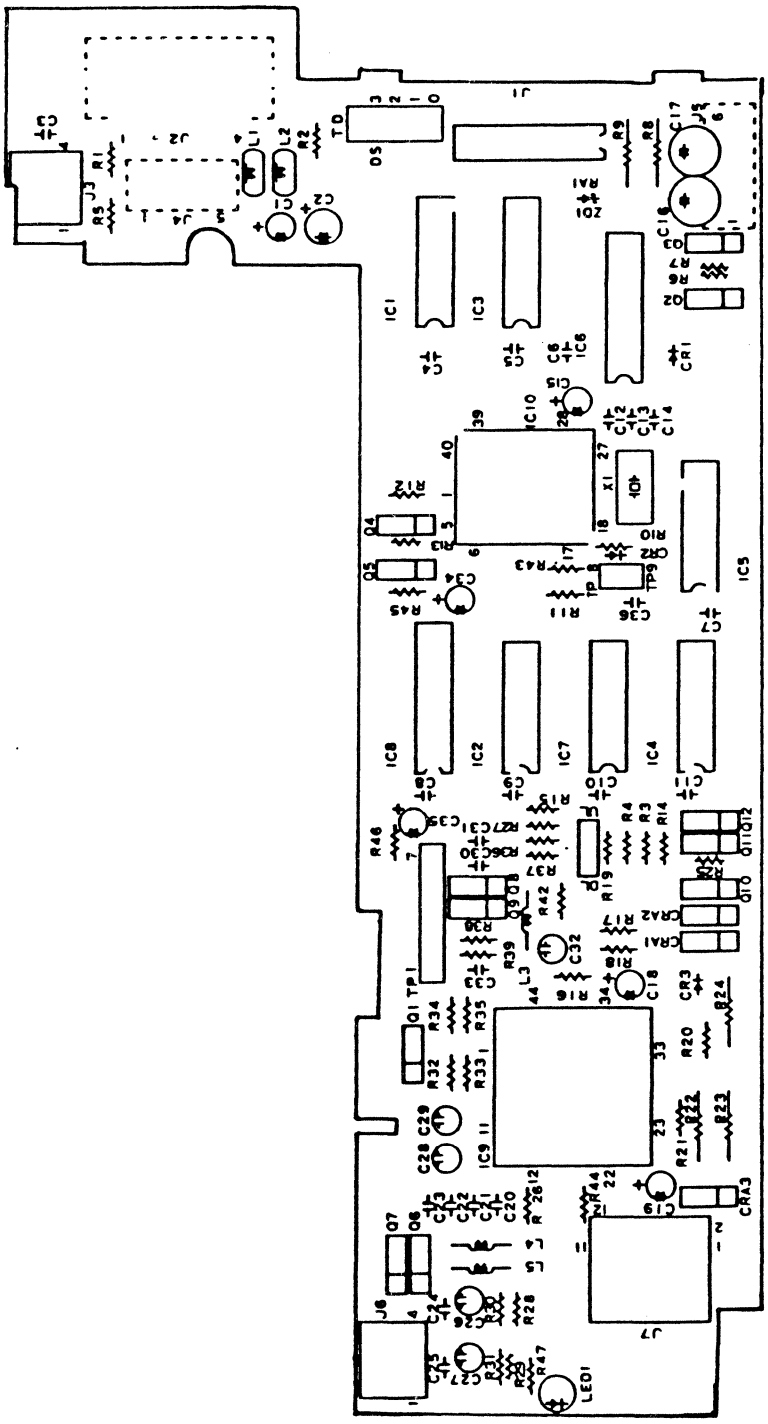
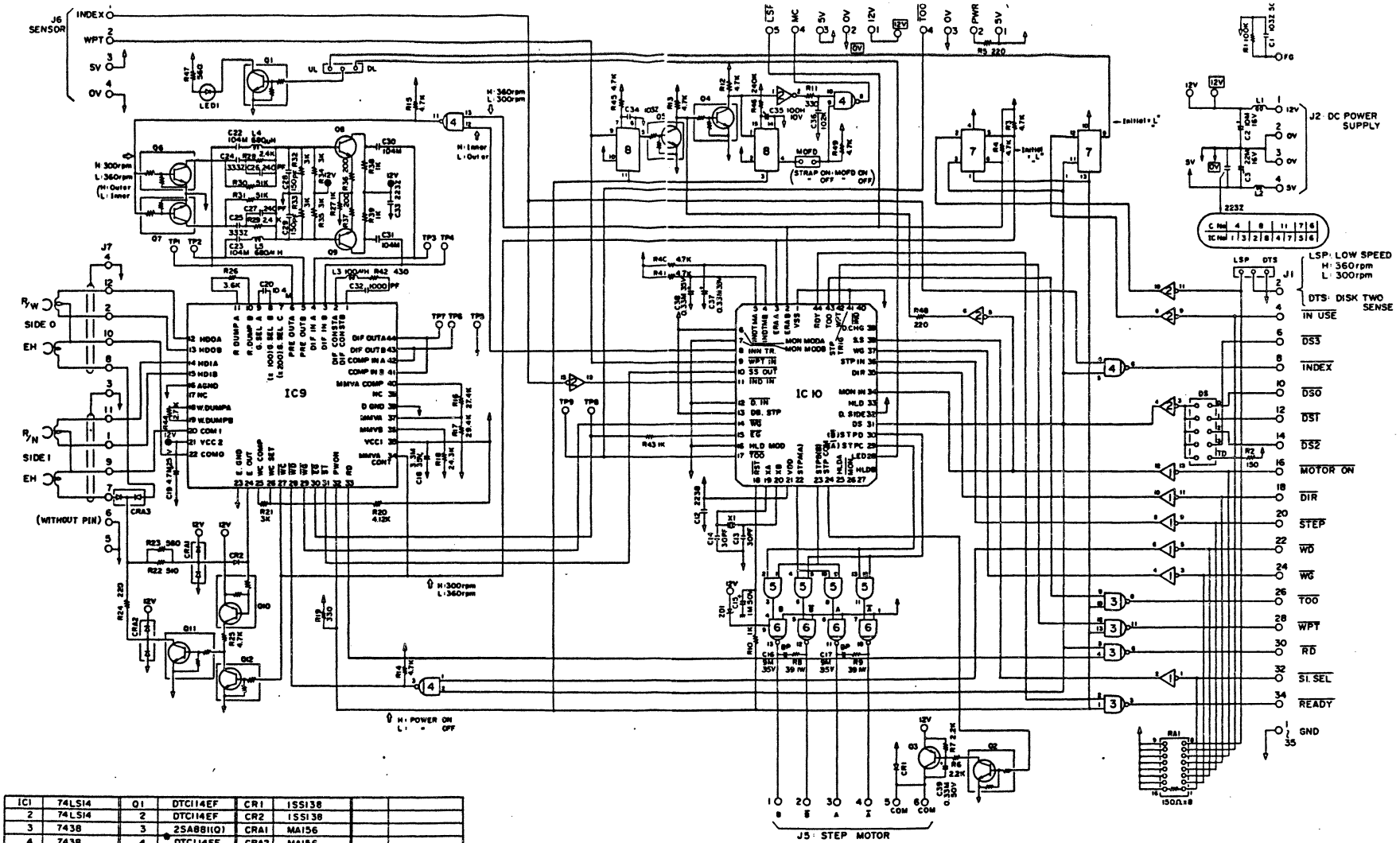
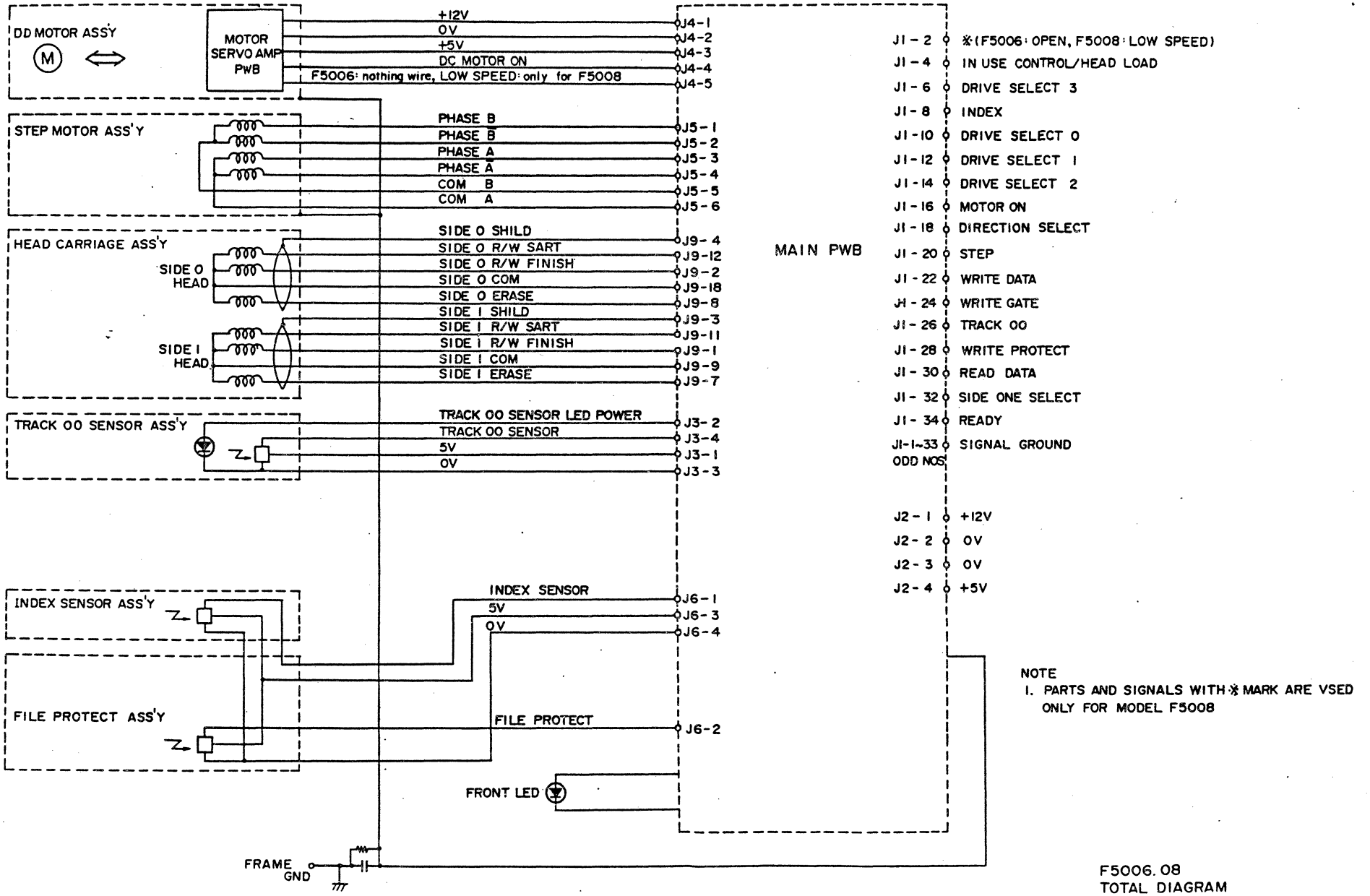


Fig. 506 Main PWB, Parts Location



IC1	74LS14	Q1	DTC114EF	CR1	1SS138	
2	74LS14	2	DTC114EF	CR2	1SS138	
3	7438	3	2SA881(0)	CRA1	MA156	
4	7438	4	DTC114EF	CRA2	MA156	
5	74LS08	5	DTC114EF	CRA3	MA154WK	
6	M-54578	6	DTC114EF			
7	74LS74	7	DTC114EF	ZD1	MTZ6.8ABC	
8	74LS123	8	2SC2021LN			
9	CX20185	9	2SC2021N	LED1	GL-5PR5	
10	FDDP	10	DTA114EF			
		11	DTC114EF	X1	4MHZ	
		12	DTC114EF			

F-5006/F-5008



F5006.08
TOTAL DIAGRAM